AD_____

GRANT NUMBER DAMD17-94-J-4207

TITLE: Reaching Black Women for a Dietary Intervention to Reduce Breast Cancer Risk

PRINCIPAL INVESTIGATOR: Margaret K. Hargreaves, Ph.D.

CONTRACTING ORGANIZATION: Meharry Medical College
                          Nashville, Tennessee 37208

REPORT DATE: September 1998

TYPE OF REPORT: Final

PREPARED FOR: Commanding General
                U.S. Army Medical Research and Materiel Command
                Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;
                        Distribution Unlimited

DTIC QUALITY INSPECTED 4

19990929 072

REPORT DOCUMENTATION PAGE

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE September 1998	3. REPORT TYPE AND DATES COVERED Final (15 Aug 94 – 14 Sep 98)

4. TITLE AND SUBTITLE
Reaching Black Women for a Dietary Intervention to Reduce Breast Cancer Risk

5. FUNDING NUMBERS
DAMD17-94-J-4207

6. AUTHOR(S)
Margaret K. Hargreaves, Ph.D.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Meharry Medical College
Nashville, Tennessee 37208

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)
A culturally-sensitive questionnaire has been developed (n=247) and validated (n=180) for African American women, to assess Transtheoretical Model-based constructs of stage of change, decisional balance, self-efficacy, situational temptation, and processes of change in this population. As well, a pilot intervention based on transtheoretical model (TTM) principles (experimental group) was compared with an intervention based on health information dissemination (control group), using a pre-post design. The experimental group reported a significant decrease in percent of energy intake from fat (9%), and increase in grams of fiber intake (22%), while the control group did not. Both experimental and control groups improved marginally in stage of change level and serum HDL. However, the experimental group improved in more variables reflecting food group selection and TTM constructs than the control group, and also improved to a greater extent than the control group when variables were the same. Given the short-term intervention (12 weeks), the small sample size (n=41), a low recruitment rate (33%), and a high attrition rate (50%), these are encouraging findings. The next stage of experimentation envisioned is a large-scale clinical trial extending over 18 months to determine whether the TTM-based method is applicable generally to African American women.

14. SUBJECT TERMS
Breast Cancer

15. NUMBER OF PAGES
160

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

FOREWORD

Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the U.S. Army.

_____ Where copyrighted material is quoted, permission has been obtained to use such material.

_____ Where material from documents designated for limited distribution is quoted, permission has been obtained to use the material.

_____ Citations of commercial organizations and trade names in this report do not constitute an official Department of Army endorsement or approval of the products or services of these organizations.

_____ In conducting research using animals, the investigator(s) adhered to the "Guide for the Care and Use of Laboratory Animals," prepared by the Committee on Care and use of Laboratory Animals of the Institute of Laboratory Resources, national Research Council (NIH Publication No. 86-23, Revised 1985).

✓ For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

_____ In conducting research utilizing recombinant DNA technology, the investigator(s) adhered to current guidelines promulgated by the National Institutes of Health.

_____ In the conduct of research utilizing recombinant DNA, the investigator(s) adhered to the NIH Guidelines for Research Involving Recombinant DNA Molecules.

_____ In the conduct of research involving hazardous organisms, the investigator(s) adhered to the CDC-NIH Guide for Biosafety in Microbiological and Biomedical Laboratories.

Margaret K Hargreaves 9/30/98
PI - Signature   Date

TABLE OF CONTENTS
Final Report

LIST OF TABLES AND FIGURES

LIST OF APPENDICES

INTRODUCTION

TABLE OF CONTENTS
Introduction

Nature Of The Problem

Fat and fiber have been implicated as important food factors associated with cancers of the colon, breast and prostate (1,2). The National Cancer Institute (NCI), in its support of dietary guidelines to reduce fat and increase fiber in the American diet, has calculated that "at a minimum, 30,000 lives could be saved by the year 2,000 if Americans would modify their dietary habits" (3). Recent reports indicate that Black Americans have a high burden for these cancers (4), and preferentially select high fat, low fiber diets (5). When compared with Whites, Black Americans (cumulative to age 70 years, 1979-81 data) suffered 8,118 excess deaths from cancer (6). It is believed that modification of dietary intakes for these food factors could have enormous benefit for cancer prevention; however, the evidence is inconclusive.

Recently, two multi-center clinical trials were implemented to determine whether a low fat eating pattern would reduce the risk of breast cancer, colon cancer, and heart disease. The Women's Health Trial was an 18 month initiative funded in 1991/92 at three sites to determine whether Blacks and Hispanics (50 - 69 years of age) could participate in a low fat clinical trial as successfully as Whites. A trial implemented in 1984 had shown that Whites could successfully lower their fat intakes by 30% [to _20% of total calories] in 24 months, their serum cholesterol by 20%, and their plasma estradiol by 17% (7-10). The Women's Health Initiative, funded in 1992 will follow 48,000 women at 45 sites over 9 years. Minority women will be represented in at least the proportion found in the general population of women 50-79 years of age (17% by the 1990 census). The overall protocol and nutrition program of these Trials are based upon those developed in the first trial with Whites (7-10).

Purpose Of Present Work

The purpose of the proposed study is to develop and test a culturally-sensitive low-fat dietary program for Black women because of their unique culture and food choices as described below, and the known difficulties of reaching blacks for their participation in risk reduction/health promotion programs (11- 15).

Background Of Previous Work

Black Food Choices

Personal and socio-cultural factors appear to affect black food choices. The typical Black diet has its origins in the slave culture of the South (16). It is high in fat and low in fiber. The diet is characterized by fried meats and vegetables, greens boiled at length with fat back or salt pork, grits eaten with butter, and sweetened fruit drinks or pop instead of fresh fruit. Such a pervasive cultural force is expected to be hard to change. Indeed, Goldsmith and Davidson reported on the success of incorporating ethnic preferences for foods such as pig ears, pig's feet, hog maw, pig tails, crackling, chitterlings, pig brain, fried and boiled chicken, collards, green beans, black-eyed peas, and turnip greens into a Diabetic Exchange List for Black diabetics attending Grady Hospital in Atlanta (17). Success was achieved through the weight lost by patients over five years of treatment. These practices are believed to satisfy important psychological needs (18,19)

Jerome has reported on the changes made by southern rural Blacks becoming acculturated to a northern urban setting in Centralia, Milwaukee (20). Her classic work describes four 'micro-cultural' groups in different states of change: those "surviving" (I); "making it" (II); "enjoying it" (III); and "living passively" (IV). These groups differed in their food choices and relationships to

the original southern pattern. It is possible that many American Blacks are in a state of acculturation to the new foodstuffs on the market in relation to their traditional or "soul" foods. Yep and Hollenbeck (21) identified three intercultural lifestyles--assimilation, pluralism, and separateness--that they encountered while providing extension services to racial minorities, and which affected program content and approaches. The questions arise: How well can Blacks who have difficulty becoming acculturated to new food patterns be changed with respect to dietary risk factors? Which groups change? How can resistant Blacks be encouraged to change for their health's sake? These are ultimate questions to which we hope our approach will begin to provide some answers. The data indicate that different loci of control are operating in Blacks, and therefore different strategies should be used to reach them.

According to Hertzler (22), nutrition educators need to know more about the cultural context in which foods are selected if they expect to change food behaviors and ultimately nutritional and health status. Hertzler defines the content and context of food selection. The content describes the actual food intake--what it is, how it is prepared, and by whom. Content is generally classified as food habits/patterns, food groups, nutrients, etc.--items that can be seen or easily measured. The context describes the meanings given to food--they may be connotative (those dealing with the physical and economic properties of food), or based on imagery (those dealing with the emotional feelings which the food engenders).

Models for Dietary Behavior Change

Several factors influence food choice (23-26). Models developed to show the relationships between these factors include variables from many sources. Sims, for example, developed a model for examining food choice within an ecological system perspective (26). In this model, the external environment is affected by natural (food production), technological (food availability), and socio-cultural influences; the internal environment is affected by personal attributes such as knowledge, attitudes, beliefs, and values. Shepherd (27,28), and Baranowski (29) have argued that a number of these influences operate through the attitudes and beliefs held by individuals, and our earlier arguments indicate that socio-cultural influences are important for Blacks (4-20).

To examine the many influences, one needs to adopt an appropriate framework within which to study them (22). But until recently, most studies of dietary behavior change and nutrition education had focused on knowledge dissemination and had largely been a theoretical (30-33). Nitzke and Athens (34) found only 30 of 157 studies of dietary behavior change specified the use of any identifiable theory or model. Theoretical frameworks which have been used in nutrition include Bandura's Social Learning Theory (31,32,35), Ajzen and Fishbein's Theory of Reasoned Action (36), Becker's Health Belief Model (37,38), Marlatt and Gordon's relapse prevention model (39), and Bandura's Theory of Self-Efficacy (37). Behavioral skills-oriented approaches from Social Learning Theory have been utilized in weight control and diabetes education programs with mixed success (40,41). The Health Belief Model has been effective in predicting dietary adherence in some (37,42) but not all studies (38). Self-efficacy appears to be an important intervening variable for initiating and maintaining dietary change (38,39,42). However, none of these models has been effective in predicting specific dietary changes such as reduction in dietary fat intake to $\leq 30\%$ of calories and these models have failed to explain why most people fail to adhere to modified diets.

A model which has not been much used in nutrition but has been effective in describing change in a variety of other health related areas is the Transtheoretical Model of Behavior Change

(44-46). This Model describes *when, how* and *why* people change behavior over time. Longitudinal studies of change have found that people pass through the following five *stages*: *precontemplation* (no intention to change), *contemplation* (seriously considering change), *preparation* (taking steps to change), *action* (actively involved in meaningful change), and *maintenance* (maintaining meaningful change) (45). The concept of *stages* describes *when* change occurs and is central to the Transtheoretical Model. However, the progression through stages to maintenance is rarely linear; some people become stuck at one stage and most people *relapse* and recycle back to a previous stage several times before successfully changing their behavior (Prochaska, in press). Studies have shown the *processes* (activities or strategies) people utilize to change vary according to stage of change (45,47). These processes describe *how* people change their behavior. Although not as clearly defined as stages and processes, results suggest that *Why* people change can be explained in part by *decisional balance* positive aspects (pros) versus negative aspects (cons) of changing the behavior (48) and, to a more stage specific extent, by perceived *self-efficacy* to resist temptations to engage in the target behavior. *Self-efficacy* has been particularly important in predicting relapse (49) and may be an important variable for understanding dietary change as well (37). The *decisional balance* dimension of the model has been successful in predicting the decision to move from precontemplation to contemplation (50,51).

Not only is The Transtheoretical Model a predictive model, it also is an integrative model that shows where *other models* fit into the change process. The Transtheoretical Model incorporates aspects of the Health Belief Model (52) and Fishbein's (53) Behavioral Intentions Model into processes of change used by precontemplators moving to the contemplation stage of change (50). Behavioral processes derived from Social Learning Theory (54) are useful for people in the action or maintenance stage of change (55). The pros and cons of behavior change (decisional balance) were developed from Janis and Mann's (56) decision making model. Bandura's (57) model of self-efficacy and Shiffman's (58) coping models have been incorporated into the self-efficacy to resist temptations component of the Transtheoretical Model. Thus the Transtheoretical Model is a "meta" model incorporating aspects of other models into its theoretical core. Such integration constitutes an inherently strong approach to model building and has been advocated for model building in general (42) and for dietary change in particular (32,59).

Dietary Change Program to Reduce Fat Intake

Dietary intervention programs aimed at reducing fat intake have had a mixed record of success. The Multiple Risk Factor Intervention Trial (MRFIT) (60), the Oslo study (61) and the Hypertension Control Program (HCP) (62) targeted fat reduction among other dietary goals; the Breast Dysplasia Intervention Trial (BDIT) (63), Nutrition Adjuvant Study (NAS)(64), and the Women's Health Trial (WHT)(7-9) focused on dietary fat reduction to approximately 20% of calories as the only dietary intervention.

The BDIT, NAS and WHT followed highly selective recruitment protocols in selecting women with or at high risk for breast cancer who were likely to comply with the rigorous data collection procedures (9,63,64). The BDIT and NAS set a goal of dietary fat at 15% of calories in contrast to the WHT's goal of 20% of calories. Nevertheless, the studies demonstrated similar results at follow-up ranging from 3 months to 2 years. The intervention groups (combined n=209) reduced dietary fat to 22 - 23% of calories; this level of dietary fat was significantly lower than the control groups' (combined n=140) intake of 36 - 37% of calories. All three studies utilized intensive intervention programs with trained professionals and detailed educational

materials. The WHT study found that changes in eating patterns in dairy products, red meats and fats/oils accounted for 70% of the observed decrease in fat intake.

Women in the WHT demonstrated that dietary interventions can be effective in reducing dietary fat intake to ≤ 30% of calories; 85% of the intervention group met this criterion at the 2 year follow-up. However, only 44% of these women could be defined as adhering to their dietary prescription of ≤ 20% calories from fat, an adherence rate similar to the 40% found in MRFIT and in other studies of dietary adherence (31).

Methodological Approach
Rationale

Although the Women's Health Trial, Breast Dysplasia Intervention Trial, and Nutrition Adjuvant Study demonstrated that dietary fat reduction to ≤ 30% of calories was feasible for highly selected groups of women, other interventions to reduce dietary fat have been less successful. Because of their food habits, Blacks are expected to find it even more difficult to adopt a low-fat diet. The National Cancer Institute has targeted dietary fat reduction as a major priority; however, existing models of dietary change have been unsuccessful in predicting change. The Transtheoretical Model has been effective in describing change in a variety of health related areas and, if extended to dietary fat reduction, and for Blacks, offers the potential for increasing our understanding of the process of change for this population group. Research on other behaviors explains why highly effective interventions only work for a small proportion of the population. Interventions designed to move people from one stage to the next can be highly effective. Action oriented programs are likely to fail for the majority of the population that is just thinking about change. People who progressed just one stage in a six month period doubled the chances they would move into the action stage of quitting smoking during the subsequent six months (65).

Overview

This proposal will develop and validate an algorithm that defines stages of change in reducing dietary fat intake to ≤ 25% of calories and will develop instruments measuring processes, decisional balance, temptation, and self-efficacy in Black women. In addition, we will conduct a longitudinal study to determine how the constructs of the model can be used to move these women from stage to stage. Strecher et al. (66) have successfully used this model in a computer format with Blacks attending a health clinic in North Carolina. Our approach will test a multi-strategic interpersonal approach.

A substantial amount of work has already been conducted on adapting the transtheoretical model to the problem of dietary fat reduction (67-70). This work has resulted in the development of a reliable and valid set of instruments for measuring all of the transtheoretical model constructs in primarily white populations. The first stage of our work will be to adapt these instruments to a population of black women living in Nashville, Tennessee.

Project Design
Year 1: Instrument Development Two studies will be conducted to develop Transtheoretical Model based dietary fat reduction measures applicable to Black women. *Study 1* is divided into 2 parts. Part 1 will use stage matched focus groups to adapt measures previously developed on Whites to our target population of Black Women. Part 2 focuses on exploratory instrument

development. *Study 2* will validate the instruments developed in *Study 1*. *Study 2* is also divided into 2 parts. Part 1 is devoted to Confirmatory Instrument Development. Part 2 focuses on external validation of the instruments.

Year 2: Intervention Program Development and Pilot Testing (*Study 3*)

Years 2 and 3: Small-scale Community Demonstration Trial with Longitudinal follow-up (*Study 4*)

Hypothesis/Purpose

Purpose

This study will extend the Transtheoretical Model of Behavior Change to dietary fat reduction in Black women.

Hypothesis to be tested

A culturally-sensitive protocol based on stage of change theory will increase the participation of Black women in a low fat intervention trial, and decrease their high fat intakes.

Technical Objectives

1. To develop and test instruments for African American women based on the Transtheoretical Stage of Change Model that assesses behaviors and intentions to reduce dietary fat intake to <25% of calories (Year 1);
2. To develop and pilot test an intensive intervention program based on the stage of change model and using the modified instruments (Year 2); and
3. To implement the tested intervention program in an 18 month community demonstration trial to see how these women change over time (Years 2-3).

Early Studies

During the first three years of this project, experience was gained in adapting the Transtheoretical Model (TTM) constructs to dietary fat reduction in African American women (10, 14,15). The TTM of Behavior Change was used to develop a culturally-sensitive intervention and associated methodologies (66-73). A summary of key results is provided below.

Developing a culturally-sensitive TTM Questionnaire (71,72)

Forty one women participated in stage-matched focus groups designed to understand black food habits; ensure that the TTM constructs of Stage, Process, Decisional Balance, Self-Efficacy, and Situational Temptation were meaningful and valid in a black population; and elicit suggestions on how to lower fat intake within the context of cultural food habits.

Focus group analyses revealed that black or "soul" food is still an important way of life for African Americans living in Nashville. It is characterized by its high fat and deep spicy flavor which must be replicated in any food that is being presented on a special diet. Suggestions for overcoming barriers to adopting a low fat diet for good health included: showing evidence of physical harm; enlisting family support; having interactive tasting sessions; training chefs, restaurateurs, and church members in healthy food preparation; and explaining to people why they are likely to lapse in attempting health behavior change. Health problems appeared to be an

important motivation for change, while lack of family support appeared to be a most important barrier for change.

Exploratory analyses related to the TTM constructs indicated that the instruments were relevant in large part to black women. No revisions were required for the Temptation Scale. Revisions were required for some scales, including additional pros and cons of importance to black women; two new difficulty scale items for self-efficacy; and three process of change factors – stimulus control, environmental re-evaluation, and reinforcement management. Confirmatory analyses repeated these findings, and subsequently enabled shortened versions of all scales for use with African American women. These analyses, conducted in Year 3, are presented in detail in this Final Report.

Developing an Eating Styles Questionnaire (72,74)

The dietary intake analysis using Kristal's Quick Dietary Screen indicated that fat intake decreased with stage of change (Stages 1,2 & 3 vs Stages 4 &5), as predicted by the Transtheoretical Model, and with age. Fat intake was not associated with income or education in this study. It may be that it is associated with health problems that come with age. The most important finding, however, was that many people who reported themselves to be at Stage 4 (action) and Stage 5 (maintenance) of eating a low fat diet were not. Sixty-four percent of people in the maintenance stage were in fact eating diets having more than 30% of fat, and similarly, 81% of people in the action stage. It is apparent that these people exhibit a lack of knowledge of low fat foods.

Cluster analysis identified 14 groups of foods which significantly separated subjects into not trying (Stages 1,2, & 3), noncompliant (Stages 4 & 5 – women eating more than 30% of dietary fat), and compliant (women eating less than 30% of fat). This led to the development of a 16-item Eating Styles Questionnaire (ESQ) which facilitated staging of the noncompliant group. The questionnaire can further pinpoint where individuals fail in selecting appropriate foods when changing dietary intake. The ESQ, therefore, has the potential of facilitating dietary counseling procedures, and increasing the efficacy of the intervention.

Developing a Culturally-Sensitive TTM-Based Dietary Intervention (72)

In the initial stages of our work, an intervention outline was developed for each stage of change, using TTM principles (Table 1 and Figure1, Appendix B). Participants who had been subjects in the first focus groups in Year 1 were brought back by stage of change, and asked to provide feedback on the proposed intervention, and thereby assist in developing the intervention appropriate for each stage. Existing NCI and other materials, including ones specifically developed for low literacy and African American audiences were presented, and reactions obtained. Sessions were held over the lunch hour, with lunch provided which reflected the dietary principles being advocated by the project. Sessions were scheduled for one hour, but ranged from 75 to 90 minutes in length. The Summary of Program Recommendations and Responses to the Dietary Intervention Materials are displayed in Tables 2 and 3 respectively, (Appendix B). Besides reducing fat, suggestions were made for increasing fiber to 20-25 grams daily.

Subjects enjoyed interaction with others of like mind and experience, and recommended an intensive and multi-faceted program of activity. Subjects were interested in meetings, mailings of relevant literature, and periodic telephone calls. From these experiences, Subject and Facilitator Manuals were developed for the pilot intervention. This intervention is reported in detail in this report.

References

1. Doll R, Peto R. The causes of cancer: quantitative estimates of avoidable risks of cancer in the United States today. Journal of the National Cancer Institute 66: 1191-1308, 1981.

2. Nigro ND, Bull AW. Prospects for the prevention of colorectal cancer. Colon Rectum 3O: 571-754, 1987.

3. Greenwald P, Sondik EJ. Editors. Cancer Control Objectives for the Nation: 1955-2000. NCI Monograph 2: 1-105, 1986.

4. Baquet CR, Ringen K, Pollack ES et al. Cancer Among Blacks and other Minorities: Statistical Profiles. DHS Publication, PHS No 86-2785, Washington DC: US Govt. Printing Office, 1986.

5. Hargreaves MK, Baquet CR, Gamshadzahi A- Diet, nutritional status, and cancer risk in American Blacks. Nutrition and Cancer 12: 1-28, 1989.

6. Heckler M. Report of the Secretary's Task Force on Black and Minority Health Vol. 1: Executive Summary USDHHS, August 1985.

7. Insull W, Henderson MM, Prentice RL, et al. Results of a randomized feasibility study of a low-fat diet. Arch. Intern. Med. 150: 421-7, 1990.

8. Henderson NM, Kushi LH, Thompson DJ, et al. Feasibility of a randomized trial of a low-fat diet for the prevention of breast cancer: Dietary compliance in the Women's Health Trial Vanguard Study. Preventive Medicine 19: 115-33, 1990.

9. Gorbach SL, Morrill-LaBrode A, Woods MN, et al. Changes in food patterns during a low-fat dietary intervention in women. Journal of the American Dietetic Association 90: 802-9, 1990.

10. Prentice RI, Thompson DJ, Clifford C, et al. Dietary fat and plasma estradiol concentration among healthy post-menopausal women. Journal of the National Cancer Institute 82:129-34, 1990.

11. Miller BA, Riel LAG, Hankey BF, et al. Cancer statistics review: 1973-1898. National Cancer Institute. NIH Publ. No. 92-2789, 1992.

12. EVAXX. A study of Black Americans' Attitudes Toward Cancer and Cancer Tests. New York: ACS, 1980.

13. The Lipid Research Clinics Coronary Primary Prevention Trial Results. 1. Reduction in incidence of coronary heart disease. Lipid Research Clinics Program. Lipid Metabolism Atherogenesis Branch, NHLBI. JAMA 251: 351, 1984.

14. Williams M, Collins A et al. Development of Diffusion Strategies Among Culturally-Diverse Populations. Final Report to the NHLBI prepared under contract No. NOI-HO2-7003.

15. Warnecke PB. Intervention in black populations. Progress in Clinical & Biological Research 53: 167-183, 1981.

16. Hargreaves, MK. Socio-cultural influences on black American food habits from slavery until now. Paper presented at the Conference on "Afro-American Culture and History" for the Nashville and Tennessee Historical Commissions and Tennessee State University, February 8, 1989.

17. Dennis R. Psychosocial aspects of folk medicine of the black elderly. Paper submitted to the Second Annual Meeting of the Southern Gerontological Society. Atlanta GA, 1981.

18. Mathews HF. Rootwork: Description of an ethnomedical system in the American South. Southern Medical Journal 80: 885-891, 1987.

19. Goldsmith MP, Davidson JR. Southern ethnic food preferences and exchange values for the diabetic diet. Journal of the American Dietetic Association 70: 61-64, 1977.

20. Jerome NW. Diet and Acculturation: The Case of Black-American In-Migrants. In Nutritional Anthropology: Contemporary Approaches to Diet and Culture, with R. Kandel and G. Pelto. New York: Redgrave Publishing Co., 1980.

21. Yep B., Hollenbeck M. A way to reach minorities: multicultural awareness. J. Extension 17: 4-9, 1979.

22. Hertzler AA, Wenkam N. Standal B. Classifying cultural food habits and meanings. Journal of the American Dietetic Association 80: 421-425, 1982.

23. Khan MA. Evaluation of food selection patterns and preferences. CRC Critical Reviews in Food Science and Nutrition 15: 129-153, 1981.

24. Randall E., Sanjur D. Food preferences - their conceptualization and relationship to consumption. Ecology of Food and Nutrition, 11:151-161, 1981.

25. Shepherd R. Dietary salt intake. Nutrition and Food Science 96:10-11, 1985.

26. Sims LS. Further thoughts on research perspectives in nutrition education. Journal of Nutrition Education 13:S70-75, 1981.

27. Shepherd R. The effects of nutritional beliefs and values on food acceptance. In J Solms, DA Booth, RM Pangbom, 0 Raunhardt (Eds) Food Acceptance and Nutrition pp. 387-402, 1987. London: Academic Press.

28. Shepherd R. Factors influencing food preferences and choice. In R Shepherd (ed.), Handbook of the Psychophysiology of Human Eating. Chichester: Wiley.

29. Baranowski T. Beliefs as motivational influences at stages in behavior change. International Quarterly of Community Health Education 13: 3-29, 1992-93.

30. Achterberg CL. Factors that influence learner readiness. Journal of the American Dietetic Association-88, 1426-1428. 1988.

31. Glanz K, Mullis RM. Environmental Interventions to promote healthy eating: A review of models, programs and evidence. Health Education Quarterly, 15, 395-415. 1988.

32. Olson CM, Kelly GL The challenge of implementing theory-based intervention research in nutrition education. Journal of Nutrition Education, 21, 280-284. 1987.

33. Sims LS. Nutrition education research: reaching toward the leading edge. Journal of the American Dietetic Association, (supplement) 87, (9), 10-18. 1987.

34. Nitzke SA, Athens SP. Journal of Nutrition Education, 19, 266-267. 1987.

35. Holli BB. Using behavior modification in nutrition counseling. Psychometrika, 30, 179-185.

36. Saunders RP, Rahilly S. Influences on intention to reduce dietary intake of fat and sugar. Journal of Nutrition Education, 22, 169-176. 1990.

37. Contento IR, Murphy BM. Psychosocial factors differentiating people who reported making desirable changes in their diets from those who did not. Nutrition Education, 22, 6-14. 1990.

38. Greene GW, Strychar I. A worksite cholesterol screening and education program. Society for Nutrition Education, Anaheim, CA- 1990 July.

39. Grilo CM, Shiffman S, Wing RR. Relapse crises and coping among dieters. Journal of Consulting and Clinical Psychology, 57, 488-495. 1989.

40. Wadden T, Stunkard A. A controlled trial of a very-low-calorie diet, behavior therapy, and their combination in the treatment of obesity. Journal of Clinical and Consulting Psychology, 54, 582-488. 1986.

41. Greene G. Behavior modification for adult onset diabetics. The Diabetes Educator, 7 (1),ii. 1981.
42. Cummings KM, Becker MH, Kirscht et al. Psychosocial factors affecting adherence to medical regimens in a group of hemodialysis patients. Medical Care, 20. 567-180. 1982.
43. McCaul KD, Glasgow RE, Schafer LC. Medical Care, 25, 868-881. 1987.
44. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: Toward an integrative model of change. Journal of Consulting and Clinical Puchology, 51, 390-395. 1983.
45. Prochaska JO, DiClemente CC. Common processes of self-change for smoking, weight control, and psychological distress. In S. Shiffman & T. Willis (Eds.), Coping and Substance Abuse (pp. 345-365). New York: Academic Press. 1985.
46. Prochaska JO, DiClemente CC. Towards a comprehensive model of change. In W. Miller & N. Heather (Eds.), Treating Addictive Behaviors (p. 3-27). New York: Plenum Press. 1986.
47. DiClemente CC, Prochaska JO. Self-change and therapy change of smoking behavior: A comparison of processes of change of cessation and maintenance. Addictive Behaviors, 7, 133-142. 1982.
48. Velicer NW, DiClemente, CC, Rossi, JS, et al. Relapse situations and self-efficacy: An integrative model. Addictive Behaviors.15, 271-283. 1990.
49. DiClemente C, Prochaska J, Gibertini M. Self-efficacy and the stages of self-change of smoking. Cognitive Therapy and Research, 9, 181-200. 1985.
50. Velicer WF, DiClemente CC, Prochaska JO et al. A decisional balance measure for predicting smoking cessation. Journal of Personality and Social Psychology, 48, 1279-1289. 1985.
51. Prochaska JO, Velicer WF, DiClemente CC, et al. Journal of Consulting and Clinical Psychology, 56,520-528. 1988.
52. Becker MH. The health belief model and sick role behavior. Health Education Monographs, 2, 409-419. 1974.
53. Azjen I, Fishbein M. Understanding attitudes and predicting social behaviors. Englewood Cliffs, NJ: Prentice-Hall.
54. Bandura A Self-efficacy mechanism in human agency. American Psychologist, 37, 122-147. 1982.
55. Rossi JS, Prochaska JO, DiClemente CC. Processes of change in heavy and light smokers. Journal of Substance Abuse, 1, 1-9. 1988.
56. Janis IL, Mann MA. Decision making: A psychological analysis of conflict, choice and commitment. New York: The Free Press. 1977.
57. Bandura A. Social Foundations of Thought & Action: A social cognitive theory. Englewood Cliffs, N.W.: Prentice-Hall. 1986.
58. Shiffman S. A cluster-analytic classification of smoking relapse episodes. Addictive Behaviors, 11, 295-307. 1986.
59. Achterberg CL, Novak JD, Gillespie AH. Theory-driven research as a means to improve nutrition education. Journal of Nutrition Education, 17, 179-184. 1985.
60. Gorder DD, Dolecek TA, Coleman GG, et al. Dietary intake in the Multiple Risk Factor Intervention Trial (MRFIT): Nutrient and food group changes over 6 years. Journal of the American Dietetic Association. 86, 744. 1986.

61. Hjermann L, Holme I., Volvo B, et al. Effect of diet and smoking intervention on the incidence of coronary heart disease: Report from the Oslo study group of a randomized trial in healthy men. Lancet, 2: 1303, 1981.

62. Stamler R, Stamler J, Grimm R. et al. Nutritional therapy for high blood pressure. Final report of a four-year randomized controlled trial - The Hypertension Control Program. Journal of the American Medical Association, 257:114-165. 1987.

63. Lee-Han H, Cousins M, Beaton M, et al. American Society for Clinical Nutrition, 48, 575-586. 1988.

64. Buzzard IM, Asp EH, Chlebowski, et al. Diet intervention methods to reduce fat intake: Nutrient and food group composition of self-selected low-fat diets. Journal of the American Dietetic Association, 90, 42. 1990.

65. Prochaska JO, DiClemente CC, Velicer WF, et al. Self-help models and materials for smoking cessation. National Cancer Institute Grant. 1990.

66. Campbell MK, Develli BM, Strecker VJ, et al. The impact of message tailoring on dietary behavior change. (Manuscript in progress.) 1993.

67. Rossi SR, Green GW, Reed G, Prochaska JO, Velicer WF, Rossi, JS. A comparison of four stage of change algorithms for dietary fat reduction. Annals of Behavioral Medicine 15:63s, 1993.

68. Rossi SR, Rossi JS. Processes of change for dietary fat reduction. Paper presented at the 14th annual meeting of the Society of Behavioral Medicine, San Francisco, CA, 1993 March.

69. Rossi SR, Rossi JS, Prochaska JO et al. Application of the transtheoretical model of behavior change to dietary fat reduction. International Journal of Psychology, 27, 628, 1992.

70. Rossi SR, Rossi JS, Prochaska JO, Velicer WF. Measurement structure of a decisional balance questionnaire for dietary fat reduction. Paper presented at the 101st annual convention of the American Psychological Association, Toronto, Ontario, Canada, 1993 August.

71. Hargreaves, MK. Annual Report Year 1: Reaching Black Women for a Dietary Intervention to Reduce Breast Cancer Risk. Department of Defense, 1995.

72. Hargreaves, MK. Annual Report Year 2: Reaching Black Women for a Dietary Intervention to Reduce Breast Cancer Risk. Department of Defense, 1996.

73. Hargreaves, MK. Annual Report Year 1: Obstacles to Primary and Secondary Prevention of Breast Cancer. Department of Defense, 1997.

74. Hargreaves, MK, Schlundt DG, Buchowski MS, Hardy RE, Rossi SR, Rossi JS. Stages of Change and the intake of dietary fat in African American women. Journal of the American Dietetic Association, Accepted, 1998.

BODY OF THE REPORT

CONFIRMATORY QUESTIONNAIRE DEVELOPMENT

TABLE OF CONTENTS
Confirmatory Questionnaire Development

Objective

To confirm that the Transtheoretical Model-based instrument developed during the exploratory phase of these studies is valid for use in African American women.

Procedures

The confirmatory studies are divided into two parts – confirmatory psychometric analyses of the TTM constructs of decisional balance, temptation, self-efficacy, and processes of change; and external validity analyses of these constructs in relation to stage of change.

Confirmatory Measurement Structural Analyses

Measurement analyses on Sample 3 using structural modeling techniques were used to confirm scales obtained as a result of the studies reported in the previous round of data collection on Sample 2. Further structural modeling techniques were employed to test the Processes of Change, Situational Temptation and Situational Self-efficacy models for evidence of hierarchical structure. A short form of the processes of change scale was developed using internal consistency (alpha) and model fit as a guide.

Internal Consistency Analyses

Scale homogeneity, the degree of internal consistency for each of the retained components, was determined using Cronbach's coefficient Alpha. While a value of .80 is highly desirable, values of .60 are considered within acceptable range (Personal Communication, Norm Cliff October 5, Annual Meeting of the Society for Multivariate and Experimental Statistics, Semi Omu, WA.) However, on the short forms of the TTM scales, lower alpha values have been obtained and commonly used with scales of only 2 items each.

Stage of Change

The stage of change algorithm was administered to all subjects so that they could be classified into one of five stages of change: Precontemplation, Contemplation, Preparation, Action or Maintenance. Three staging algorithms were considered: Intention alone (Algorithm 1), intention plus a 30% or less criterion (Algorithm 2) based on Quick Screen results, and intention plus a 25% or less criterion (Algorithm 2) based on Quick Screen results. External validity analyses were conducted with Algorithm 1 due to low distribution of subjects meeting criteria for Algorithms 1 and 2.

Fat Intake Analyses

Consistent with the previous two studies, the Dietary Quick Screen Questionnaire (Kristal et al., 1990) was used to calculate percent of energy from fat.

External Validity Testing

The relationship between subject's Stage of Change and the Transtheoretical Model construct measured by each of the instruments from Study 3 was examined using multivariate analysis of variance (MANOVA) for evidence of external validity. For these analyses, Stage of Change (Algorithm 1), was used as the independent variable, and Processes of Change, Decisional Balance, Situational Temptation and Situational Self-efficacy as dependent measures. Follow-up tests including separate

analyses of variance (ANOVA) and Tukey HSD procedures to illuminate group differences among stages of change.

Results and Discussion

<u>Sample</u>
Confirmatory data on Stage of Change, Decisional Balance, Temptation, Confidence and Processes were analyzed based on completed data from 180 African-American women. The mean age of the sample was 41 years ($\underline{SD}$ = 12.3). Women had an average educational level of 15.2 years ($\underline{SD}$ = 03.8).

<u>Stage of Change</u>
Three stages of change algorithms were explored. Algorithm 1 consisted of a traditional algorithm based on beliefs and intentions about reducing dietary fat consumption alone as used by Curry et al (1992) and others. The two other algorithms included beliefs and intentions about reducing dietary fat consumption but required the addition of behavioral criteria for staging subjects in action and maintenance as recommended by Greene et al (1994). Algorithm 2 was based on an intake of 30% or less fat from total daily calories while Algorithm 3 was based on the target intake of 25% or less fat from total daily calories. Only 4 subjects met the 25% or less fat from daily kcals. Similarly, only 16 subjects met the 30% or less criterion. Only 2% of the sample met the 25% dietary fat intake criteria for action and maintenance, while only 9% met the 30% dietary fat intake criterion. Thus, validation analyses (e.g., discriminant function analysis, multivariate analysis of variance) could not be conducted using the 25 or 30% algorithms due to large discrepancies in sample size by stage of change. These analyses were therefore conducted using the traditional stage of change algorithm 1. Stage of change distributions for each Algorithm are presented in Tables 1 - 3. Stage distributions for study 3 were similar to those encountered in Study 2. Results of the stage of change distributions using the traditional algorithm replicate previous findings of a high number of individuals in the action and maintenance stages despite their failure to met the recommended levels for dietary fat intake. The stage results in this study suggest that like Whites, many Black Women believe they have reduced their dietary fat consumption to an acceptable level even though their measured dietary behavior indicates they have not.

<u>Dietary Fat Intake</u>
The 53-item Dietary Quick Screen Questionnaire (Kristal et al., 1990) was again used to assess the relative amount of fat subjects consumed in their diet. Mean fat intake for the second sample was 39% ($\underline{SD}$ = 06.2). Dietary fat intake for Black Women in this study was much higher than found in previous TTM studies which used the Dietary Quick Screen Questionnaire to measure fat intake in Whites ($\underline{M}$ = 32% to 35%) Greene et al, 1994. These data support dietary fat consumption as a high risk health behavior for African-American Women in particular.

Confirmatory Psychometric Analyses

Decisional Balance

The 8 item decisional balance scale found more acceptable to African-American Women was utilized in Study 3. The 2 factor structure of the instrument derived on Sample 2 represented by 4 pros and 4 cons was replicated on Sample 3. Results of model fit indicated that the theoretical model fit the data (Figure 1) (CFI =.94, RMS = .066). The value of the RMS is a bit higher than desired, suggesting the model could use improvement. Model fit for study 2 had been excellent (CFI =.96, RMS = .04). With the exception of a single loading, factor loadings for the model in Study 3 obtained from measurement analyses using structural equation modeling were adequate (exceeded .50 criteria). A loading of .40 was obtained for item 05. A value greater than 3.0 indicates the item loads on its factor, but is below the desired 5.0 criteria. Items loadings ranged from .40 to .86, ($\underline{M}$ = .68). Items loadings for the decisional balance scale in Study 2 had been higher, ranging from .60 to .84, ($\underline{M}$ = .69). Although lower than in the previous sample, the mean for loadings are similar. Correlation between the pros and cons for Study 3 was low (r = .037). The correlation obtained in the previous Study 2 was higher (r = .27). Internal consistency (Alpha) coefficients for Study 3 decisional balance scales are adequate (pros = .86, cons .67, mean = .76). Although lower than in the previous sample Study 2 (pros = .82, cons .74, mean = .78), means for internal consistency are similar. Item means were within acceptable range. Scale means, standard deviations and alphas are presented in Table 4. Recruitment for Sample 3 presented a difficult challenge. We believe the lower correlation, and lower loadings obtained in Study 2 are sample dependent due to a lower quality of the data collected. Since the measurement structure of the decisional balance scale in Study 2 was confirmed by Study 3, we believe the pros and cons scales designed specifically for African-Americans are valid but require further testing on additional samples.

Temptation

The 3 factor, 9 item structure cross-validated (S. Rossi, Greene, Reed, Prochaska, & Velicer, 1993) in whites was also cross-validated in this third sample of African-American women (Figure 2). The data indicate that African-American women also found the temptation construct relevant. Temptation represents how tempted an individual is to eat high fat foods in three specific situations: positive/social situations, negative/affective situations and difficult situations. Internal consistency (Alpha) coefficients for the three temptation scales ranged from .81 to .90, mean = .85. These results were similar to Study 2 results in which the internal consistency of the three scales, ranged from .78 to .92, mean = .85 compared to Study 1 focus group results (range = .72 to .90, mean = .78) and Whites (range =.80 to .92, mean = .86). The overall 9 item Temptation scale was found to have a good internal consistency coefficient of .88 which is very similar to the results obtained in Study 2 (.89). Item means were acceptable. Measurement model loadings obtained using structural modeling techniques were acceptable ranging from .73 to .88, mean = .81). These results were very similar to those obtained in Study 2 (.71 to .91, mean = .81). Model fit was excellent (CFI =.97, RMS = .04), indicating that the theoretical model fit the data very well. These results were also very similar to those obtained in Study 2 (CFI =.98, RMS = .03). Correlation between positive social and difficult situations for Study 3 was still some what higher than desired (r =.76) but an improvement over results obtained in Study 2 (r =.84). Correlations between the Positive Social and Negative affective scale were adequate (r = .48). Correlations between the Negative affective and difficult scales were adequate (r = .52). Scale means, standard

deviations and alphas are presented in Table 4. The final temptation instrument adapted for Black women is similar to and based on the situational temptation measure for dietary fat reduction previously developed on Whites (Rossi, 1993).

A One factor hierarchical model has been documented in previous TTM temptation studies in which all three lower order situational factors load on a single higher order factor representing overall temptation. Results provide an additional test of the applicability of the Transtheoretical Model Temptation construct to dietary fat reduction. The 9 item, 3 correlated factors model derived in Study 2 was used as a basis for this analysis. Sample 3 results revealed a 1 factor hierarchical structure as predicted (Figure 3).

Self-efficacy

The 3 factor structure of the 9 item situational confidence scale found previously in the Study 2 data was replicated in Study 3. A high correlation was detected between the Positive Social and Difficult scales in Sample 3 and are believed to be sample dependent since it was not encountered with Sample 2 and the higher order model fits well. The high correlation encountered in the 3 factor 9 item measurement model is not a problem since according to Velicer et al., (1990), the higher order model fits well and is actually how this model should be tested. Internal consistency (Alpha) coefficients for the three confidence scales were good, ranging from .78 to .89, (mean = .84). These results are similar to those obtained with Sample 2 (.82 to .92, mean = .87). The overall 9 item Self-efficacy scale was found to have excellent internal consistency (Alpha = .91) and is constant with Sample 2 results (Alpha = .90). Scale means, standard deviations and alphas were acceptable and are presented in Table 4. The measurement model (Figure 4) obtained using structural modeling techniques indicated loadings for all three factors were acceptable Model fit was excellent (CFI =.98, RMS = .048), indicating that the theoretical model fit the data very well. These results were compatible with previous findings in Sample 2 (CFI =.92, RMS = .04). Item loadings for all three factors were acceptable (range = .71 to .87, mean = .80). Loadings were similar to those found in Sample 2 (range = .73 to .98, mean = .83).

A One factor hierarchical model has been documented in previous TTM studies of self-efficacy in which all three lower order situational factors load on a single higher order factor representing overall confidence. Results provide an additional test of the applicability of the Transtheoretical Model Self-efficacy construct to dietary fat reduction. The 9 item, 3 correlated factors model derived in Study 2 was used as a basis for this analysis. Results revealed a 1 factor hierarchical structure as predicted (Figure 5).

Processes of Change

The Processes of Change construct represents strategies and techniques which individuals engage in during attempts to reduce fat consumption. The construct was found to be relevant to African-American women. Results of Study 3 replicated the 11 process structure of a 33 item scale from the first and second samples as well as White populations. All but one internal consistency (Alpha) coefficient for the 11 process scales were acceptable ranging from .43 to .83 ($\underline{M}$ =.75). Internal consistency (Alpha) coefficients for the 33 item, 11 process scales in Sample 2 were similar, ranging from .70 to .85 ($\underline{M}$ =.78). The coefficient alpha for this same scale had been .80 in Sample 2. It is plausible that the drop in the alpha for Stimulus Control may be related to

the quality of the data for sample 3 and is sample dependent. All but one item loaded acceptably (Stimulus control item 5 = .21). This same item also had a low loading of .39 in Sample 2. The similar loadings for both rounds of data suggest that this is a bad item and should be dropped from the scale. While failure of a single item to load indicates the item did not measure the construct adequately and could be improved on, replication of the 11 factor measurement structure was still achieved. Model fit (Figure 6) was good (CFI =.93, RMS = .056), indicating that the theoretical model fit the data well. Loadings were acceptable for all processes and with all but one item exceeding the .50 criterion (range =.21 to .88, mean = .70). These results are very similar to those obtained for sample 2 (CFI =.93, RMS = .056), loadings ranging from (.39 to .89, mean = .74). Residuals between some factors were found to be high and were similar to previous results in sample 2. This is not an uncommon finding with models that involve higher order factors. Scale means, standard deviations and alphas are presented in Table 4.

A two factor hierarchical model has been documented in previous processes of change studies with some processes loading as experiential and others as behavioral. As higher order factors could explain some of the high residuals, structural modeling techniques were employed to test the measurement model for evidence of hierarchical structure. Results provide an additional test of the applicability of the Transtheoretical Model Process construct to dietary fat reduction. The 33 item, 11 correlated factors model was used as a basis for this analysis. Results revealed a 2 factor hierarchical structure of Experiential and Behavioral processes (Figure 7). Six primary lower order processes: Consciousness Raising, Dramatic Relief, Self Reevaluation, Self Liberation, Environmental Reevaluation, and Social Liberation loaded on the higher order Experiential factor as expected. Five lower order primary processes: Helping Relationships, Reinforcement Management, Interpersonal Systems Control, Counter Conditioning, and Stimulus Control were found to load on the higher order Behavioral factor as expected. Loadings and the correlation between the two higher order processes were acceptable. These results were consistent with Transtheoretical Model predictions of hierarchical process structure.

In an attempt to reduce subject burden in future administrations of the process of change scale, the 33 items were further reduced to a shortened final 22 item version of the instrument. Scale means, standard deviations and alphas are presented in Table 4. When compared to the internal consistency (Alpha) coefficients for the same 22 process items previously obtained from the focus groups in sample 1 and those from Whites, results in this sample were similar (Table 5). Internal consistency (Alpha) coefficients for the 22 item, 11 process scales in Sample 3 ranged from .63 to .81 ($\underline{M}$ =.72). Model fit (Figure 8) was good (CFI =.93, RMS = .05), indicating that the theoretical model fit the data well. Loadings were acceptable with all items exceeding the .50 criterion (range =.55 to .90, mean = .76).

A two factor hierarchical model was tested for the short form of the Processes of Change. The 22 item, 11 correlated factors model was used as a basis for this analysis. Results revealed a 2 factor hierarchical structure of Experiential and Behavioral processes (Figure 9). As with the 33 item model, six primary lower order processes: Consciousness Raising, Dramatic Relief, Self Reevaluation, Self Liberation, Environmental Reevaluation, and Social Liberation loaded on the higher order Experiential factor as expected. Five lower order primary processes: Helping Relationships, Reinforcement Management, Interpersonal Systems Control, Counter Conditioning, and Stimulus

Control were found to load on the higher order Behavioral factor as expected. Loadings and the correlation between the two higher order processes were acceptable. Boundary problems with beta paths for SR and IP on the higher order factors were encountered with the initial 22 item 2 factor hierarchical model. Model fit improved when these paths were set equal. These final results were consistent with Transtheoretical Model predictions of hierarchical process structure.

<u>External Validity Analyses</u>

Stage By Decisional Balance Relationship.

A one way multivariate analysis of variance (MANOVA) was performed on the 8 item decisional balance data to determine if the pros and cons of dietary fat reduction varied with Stage of Change. Stage Algorithm 1 was used. The MANOVA was conducted using stage of change as the independent variable and pros and cons of decisional balance as dependent variables. Listwise deletion was used with data from 4 of the 180 subjects excluded due to missing data. This resulted in a total sample size of 176 for this analysis. Subjects consisted of 27 Precontemplators, 38 Contemplators, 24 in Preparation, 43 in Action and 43 Maintenance subjects. No violations of the assumptions for MANOVA were detected.

The MANOVA resulted in a significant main effect for Stage, Wilk's $L = .82$, $p < .001$, approximate $F (8,340) = 4.50$, multivariate $h^2 = .095$, accounting for 10% of the variance. These results indicate that pros and cons vary by stage of change, providing evidence of external validity for the instrument. Follow-up univariate analyses of variance (ANOVA) were conducted on the raw data for the pros and cons scales separately to detect group differences between stages. No violation of the assumption of homogeneity of variance was detected for the Pros or Cons so follow-up tests were conducted using the harmonic mean. The one-way analysis of variance performed on the Pros scale was significant, $F (4,171) = 4.30$, $p < .01$, $h2 = .09$, accounting for 9% of the variance. A follow-up Tukey-HSD procedure was conducted to detect where differences lay among the groups. As consistent with previous TTM predictions, results showed that early stage subjects (precontemplators) endorsed lower pros than later stage subjects (Preparation, Action or Maintenance). The one-way analysis of variance performed on the Cons scale was significant, $F (4,171) = 4.09$, $p < .01$, $h2 = .087$, accounting for 9% of the variance. A follow-up Tukey-HSD procedure was conducted to detect where differences lay among the groups. As consistent with previous TTM predictions, results showed that early stage subjects (Precontemplators and Contemplators) endorsed higher cons than later stage subjects (Maintenance). These results also provide support for the measure.

A Discriminant Function Analysis (DFA) was performed on the raw decisional balance data using the direct method as a follow-up test to the statistically significant MANOVA. The pros and cons of decisional balance were examined for ability to discriminate among the five groups. As with the previous MANOVA, five levels of stage of change were used (PC,C,P, A,M) via stage algorithm 1. Sample size and stage sample sizes remained the same. A single discriminant function was calculated, with a significant Wilk's $L = .82$, $p < .001$, combined $c^2(8) = 34.52$. Only the first function was significant: Wilk's $L = .95$, $p < .05$, $c^2(3) = 10.04$. The squared canonical correlation for the single discriminant function was $R^2 = .13$ explaining 13% of variance between the groups. Using a criterion of $\geq .3$ as a cutoff, loadings suggested that function one was associated with both the pros and cons of change. The first discriminant function maximally separated Precontemplators from subjects in Preparation, Action and Maintenance; Contemplators from people in Preparation, and Action and

Maintenance; and people in Preparation from those in Maintenance. The magnitude of the effects in separating the groups may be interpreted in terms of differences in standard deviation units between group centroids using Cohen's (1988) small (.2), medium (.5) and large (.8) effects. Group Centroids, the ordered structure matrix of the pooled within-groups correlations between the discriminating variables and the significant canonical discriminant function are presented in Table 6. A large effect close to 1 1/4 SD was found for the pros and cons between Precontemplators and subjects in Maintenance (-1.23). Large effects just under 1 standard deviation (SD) were found for the pros and cons between Precontemplators and Contemplators (-.95); Precontemplators and Action subjects (-.88); and Precontemplators and those in Preparation (-.77). A medium size effect close to 2/3 of a SD was found for the pros and cons between Contemplators and subjects in Action (-.60) and close to 1/2 a SD between subjects in Contemplation and Preparation (-.49) and Preparation and Maintenance (.46). An examination of means for the pros and cons of change by stage of change grouping indicated that lower scores were associated with Precontemplation and higher scores associated with Preparation for the pros. For the cons, lower scores were associated with Maintenance and higher scores with Preparation. These results are consistent with TTM predictions of higher cons lower pros for early stage subjects and lower cons, higher pros for later stage subjects.

For the purposes of the overall pattern examination and comparison with results from other decisional balance studies across problem areas, raw scores for both the Pros and Cons were converted to standardized T scores ($M = 50$, $SD = 10$) and plotted for each of the five Stages of Change. Means and standard deviations for the Pros and Cons scales in T scores by stage of change are presented in Table 7. As expected, mean endorsement of the Pros and Cons varied by Stage of change. When plotted by Stage of Change (Figure 10), the pros and cons for changing behavior to reduce dietary fat consumption followed the basic characteristic pattern (Prochaska, Velicer, Rossi, Goldstein et al., 1994). The cons of dietary fat reduction appear higher than the pros in Precontemplation, are about equivalent at a decisional balance point in Preparation, and reverse so that the pros appear higher than the cons in Maintenance. These results suggest the measure is externally valid.

Stage By Situational Temptation and Self-efficacy Relationships.
A one way multivariate analysis of variance (MANOVA) was performed on the raw confidence and Temptation data to determine if the Temptation and Situational Self-efficacy scales for dietary fat reduction varied with Stage of Change. Stage Algorithm 1 was used. The MANOVA was conducted using stage of change as the independent variable and dependent variables included overall temptation and confidence. Listwise deletion was used with data from 9 of the 180 subjects excluded due to missing data. This resulted in a total sample size of 171 for this analysis. Subjects consisted of 26 Precontemplators, 37 Contemplators, 25 in Preparation, 41 in Action and 42 Maintenance subjects. No violations of Homogeneity of the Dispersion Matrices the assumptions for MANOVA were detected. The overall MANOVA resulted in a significant main effect for stage of change, Wilk's L = .79 $p < .001$, approximate $F (8,330) = 5.07$, multivariate $h^2 = .11$, accounting for 11% of the variance.

Follow-up univariate analyses of variance (ANOVA) were also conducted for both the overall temptation and overall self-efficacy scale to detect differences between stages in different situations. No violations of the assumption of homogeneity of variance were detected for either the temptation or confidence scales and all follow-up tests for them were conducted using the harmonic mean of all the groups. The one-way analysis of variance performed on the overall temptation scale was significant, F

(4,166) = 3.69, p < .01 h^2 = .08 accounting for 8% of the variance. A follow-up Tukey-HSD test revealed that subjects in Preparation experienced more temptation than Precontemplators, Action or Maintenance subjects. The one-way analyses of variance performed on the Self-efficacy scale was also significant, F (4,166) = 6.00, p < .001, h^2 = .13 accounting for 13% of the variance. A follow-up Tukey-HSD test revealed that subjects in Maintenance experienced more confidence than Precontemplators. People in Action also experienced more confidence than subjects in Precontemplation or Contemplation. The significant MANOVAs indicate both the overall temptation and overall self-efficacy scales have some external validity. In addition, results showing that subjects in the early stages of change have more temptation and those in the later stages have more confidence is consistent with previous TTM studies and provide some external validity for the scale.

A Discriminant Function Analysis (DFA) was performed on the raw Temptation and Self-efficacy data using the direct method as a follow-up test to the statistically significant MANOVA. The scales were examined for ability to discriminate among the five groups. Five levels of stage of change were used (PC,C,P, A,M) via stage algorithm 1. Sample size and stage sample sizes remained the same as with the MANOVA. Two discriminant functions were calculated, with a significant Wilk's L = .79, p < .001, combined $c^2(8)$ = 38.59 for Function 1 and Wilk's L = .92, p < .01, combined $c^2(3)$ = 13.59 for Function 2. . Using a criterion of $\geq$ .3 as a cutoff for the structure matrix loadings suggested that Function 1 was found to be associated with Overall Self-efficacy while Function 2 was associated with Overall Temptation. The squared canonical correlation for the first discriminant function was R^2 = .14 explaining 14% of variance between the groups. The squared canonical correlation for the second discriminant function was R^2 = .08 explaining 8% of variance between the groups. The first discriminant function maximally separated Precontemplators from Contemplators, Preparation and Action subjects, and people in Preparation from Action and Maintenance subjects for Overall Self-efficacy. The second discriminant function maximally separated Precontemplators from Action and Maintenance subjects, Contemplators from Action and Maintenance subjects, Preparation subjects from Action and Maintenance subjects and Action from Maintenance subjects for Temptation. The magnitude of the effects in separating the groups may be interpreted in terms of differences in standard deviation units between group centroids using Cohen's (1988) small (.2), medium (.5) and large (.8) effects. Group Centroids, the ordered structure matrix of the pooled within-groups correlations between the discriminating variables and the significant canonical discriminant function are presented in Table 8. A large effect of 1 SD was found for overall confidence between Precontemplators and people in Action (1.04); over 3/4 of a SD between subjects in Precontemplation and Maintenance (-.77), Contemplation and Action (.84) and Preparation and Action (.85). A medium size effect greater than 1/2 of a SD was found for confidence between subjects in Contemplation and Maintenance (-.57), Preparation and Maintenance (-.58) and Action and Maintenance (-.58). A large effect of 1 SD was found for overall temptation between Precontemplators and Contemplators (-1.01); 3/4 of a SD between subjects in Preparation and Maintenance (.73). A medium size effect close to 2/3 of a SD was found for temptation between Contemplators and subjects in Preparation (.64) and subjects in Preparation and those in Action (.58). Close to 1/2 a SD difference was found between subjects in Precontemplation and Action (.43). An examination of means scores for both overall temptation and overall self-efficacy by stage of change grouping indicated that lower scores were associated with Precontemplation and higher scores associated with Action for confidence. The self-efficacy results are consistent with TTM predictions and low temptation scores have been reported with some previous White samples.

For the purposes of pattern examination, raw scores for overall temptation and confidence were converted to standardized T scores ($\underline{M}$ = 50, $\underline{SD}$ = 10) and plotted by stage of change (Figure 11). Means and standard deviations in T scores by stage of change are presented in Table 9 and for Overall Temptation and Table 10 for Overall Self-efficacy. As expected, mean endorsement of temptation and confidence varied by Stage of change. Higher temptation and lower confidence in early staged subjects and lower temptation and higher confidence in later stages is consistent with previous TTM studies of temptation (Rossi, 1993, Velicer et al, 1990). Similar low temptation scores in Precontemplation and Maintenance subjects have been reported as sample dependent in previous dietary studies (Rossi, 1993).

Stage By Process of Change Relationship

A one way multivariate analysis of variance (MANOVA) was performed on the raw process data (22 item scale) to determine if the processes of change for dietary fat reduction varied with Stage of Change. Stage Algorithm 1 was used. The MANOVA was conducted using stage of change as the independent variable and the 11 processes of change as dependent variables. Listwise deletion was used with data from 18 of the 180 subjects excluded due to missing data. This resulted in a total sample size of 162 for this analysis. Subjects consisted of 25 Precontemplators, 37 Contemplators, 22 in Preparation, 39 in Action and 39 in Maintenance. No violation of Homogeneity of the Dispersion Matrices or for other assumptions of MANOVA were detected. The MANOVA resulted in a significant main effect for Stage, Wilk's L = .51, p < .001, approximate F [(44,564.34) = 2.44, multivariate h^2= .15, with the processes accounting for 15% of the variance. These results indicate that processes of change vary by stage of change, providing evidence of external validity for the instrument. Follow-up univariate analyses of variance (ANOVA) were conducted on the raw data for the processes of change scales separately to detect group differences between stages. Violations of the assumption of homogeneity of variance was detected for the Processes of dramatic relief, helping relationships and reinforcement management, hence, these ANOVAs were not interpreted. No violations of ANOVA were detected for the other processes of change so follow-up tests were conducted using the harmonic mean.

The one-way analysis of variance performed on the Consciousness Raising (CR) scale was significant, F (4,157) = 8.00, p < .001, h2 = .17, accounting for 17% of the variance. A follow-up Tukey-HSD procedure was conducted to detect where differences lay among the groups. Action subjects were found to use CR more than Precontemplators. Maintenance subjects were found to use this process more than Precontemplators, Contemplators, or subjects in Preparation. A one-way analysis of variance performed on the Self-Reevaluation (SR) scale was significant, F (4,157) = 9.48, p < .001, h2 = .19, accounting for 19% of the variance. A follow-up Tukey-HSD procedure revealed that Action subjects used SR more than Precontemplators. Maintenance subjects were found to use this process more than Precontemplators or Contemplators. A one-way analysis of variance performed on the Self-Liberation (SL) scale was significant, F (4,157) = 12.79, p < .001, h2 = .24, accounting for 24% of the variance. A follow-up Tukey-HSD procedure revealed that Action used SL more than Precontemplators. Maintenance subjects were found to use this process more than Precontemplators, Contemplators, or subjects in Preparation. The one-way analysis of variance performed on the Environmental Reevaluation (ER) scale was significant, F (4,157) =4.00, p < .01, h2 = .09, accounting for 9% of the variance. A follow-up Tukey-HSD procedure revealed that Maintenance subjects used ER more than Precontemplators or Contemplators. The one-way analysis of variance performed on the

Social Liberation (SL) scale was significant, F (4,157) = 5.99, p < .001, h2 = .13, accounting for 13% of the variance. A follow-up Tukey-HSD procedure revealed that Action subjects used SO more than Contemplators. Maintenance subjects were found to use this process more than Precontemplators or Contemplators. The one-way analysis of variance performed on the Interpersonal Systems Control (IP) scale was significant, F (4,157) = 2.53, p < .05, h2 = .06, accounting for 6% of the variance. The Tukey-HSD procedure did not detect any differences between the groups. The one-way analysis of variance performed on the Counterconditioning (CC) scale was significant, F (4,157) = 3.39, p < .01, h2 = .08, accounting for 8% of the variance. The Tukey-HSD procedure showed that showed that Action subjects used CC more than Precontemplators or Contemplators. The one-way analysis of variance performed on the Stimulus Control (SC) scale was significant, F (4,157) = 4.179, p < .01, h2 = .10, accounting for 10% of the variance. The Tukey-HSD procedure showed that subjects in Maintenance were found to use SC more than Precontemplators. As consistent with previous TTM predictions, results showed that Precontemplators use the processes of change the least and process use increases with stage of change thus provide further support for external validity of the process measure.

A Discriminant Function Analysis (DFA) was performed on the raw data using the Direct method as a follow-up test to the statistically significant MANOVA with the 11 processes of change for discriminating among the five groups. The processes of change were examined for ability to discriminate among the five groups. As with the previous MANOVA, five levels of stage of change were used (PC,C,P, A,M) via stage algorithm 1. Sample size and stage sample sizes remained the same. Four discriminant functions were calculated. The first discriminant function was significant with a significant Wilk's L = .51, p < .001, combined $c^2(44)$ = 101.87. The squared canonical correlation for the single discriminant function was R^2 =.32 explaining 32% of variance between the groups. Using a criterion of $\geq$ .3 as a cutoff, loadings suggested that function one was associated with SL, SR, CR, SO, SC and ER. The single discriminant function maximally separated Precontemplators from subjects in Preparation, Action and Maintenance; Contemplators from people in Action and Maintenance; and people in Preparation from those in Action and Maintenance; and Action subjects from Maintenance subjects. The magnitude of the effects in separating the groups may be interpreted in terms of differences in standard deviation units between group centroids using Cohen's (1988) small (.2), medium (.5) and large (.8) effects. Group Centroids, the ordered structure matrix of the pooled within-groups correlations between the discriminating variables and the significant canonical discriminant function are presented in Table 11. Large effects close to 2 SD was found for the processes of change between Precontemplators and subjects in Maintenance (1.85); about 1 1/2 a SD between Contemplators and subjects in Maintenance (1.51) and Preparation and subjects in Maintenance (1.42), as well as 1 SD between Precontemplators and Action subjects (-1.16); close to 3/4 of a SD between subjects in those in Preparation -(.73) and Action Contemplators and Action (-.82). Medium size effects were found for the processes of about 2/3 between subjects in Action and Maintenance (.69) and close to 1/2 a SD between Precontemplation and Preparation (.43). An examination of means for the processes of change by stage of change grouping indicated that lower scores were associated with Precontemplation and higher scores associated with Maintenance. These results are consistent with TTM predictions.

For the purposes of the overall pattern examination and comparison with results from other processes of change studies across problem areas, raw process scores were converted to standardized

T scores ($\underline{M}$ = 50, $\underline{SD}$ = 10) and plotted for each of the five Stages of Change. Means and standard deviations for the 33 item Processes of Change scales in T scores by stage of change are presented in Table 12. Means and standard deviations for the short form of the Processes of Change scales (22 item) in T scores by stage of change are presented in Table 13. As expected for both scales, mean endorsement of the Processes varied by Stage of change. When plotted by Stage of Change (Figures 12 and 13), the processes used in changing behavior to reduce dietary fat consumption followed a similar pattern of increasing process use found in previous process studies for dietary fat reduction. These results suggest the measures are externally valid.

Conclusions

Data from a third administration of Transtheoretical Model (TTM) on a third sample of 180 African-American women were analyzed during year 03. Results of Sample 3 are described below. Study 3 validated many of the results of Studies 1 (focus groups data) and 2 (sample 2 administration). Confirmatory psychometric procedures (e.g., confirmatory factor analysis, structural equation modeling, etc.) and external validation procedures (e.g. multivariate analysis of variance, discriminant function analysis,) were employed and previous versions of the instruments shortened where possible. At this time the confidence scale continues to require further confirmatory testing before a shortened version of the scale can be adopted.

References

Bollen KA. Structural equations with latent variables. New York: Wiley, 1989.

Cohen J. Statistical power analysis for the behavioral sciences (2nd ed.) Hillsdale, NJ: Lawrence Erlbaum, 1988.

Curry S.J., Kristal AR, Bowen DJ. An application of the stage model of behavior Change to dietary fat reduction. Health Education Research: Theory & Practice, 7, 95-105, 1992.

Dwyer JH Statistical models for the social and behavioral sciences. New York: Oxford University Press, 1983.

Fava JL, Velicer WF, Rossi JS. Procedures for developing quality measures. Paper presented at the 16th annual conference of the Society of Behavioral Medicine, San Diego, CA, (1995, March).

Greene GW, Rossi SR, Reed GR, Willey C, Prochaska JO. Stages of change for reducing dietary fat to 30% of energy or less. Journal of the American Dietetic Association, 94:1105-1110, 1994.

Horn JL. A rationale and test for the number of factors in factor analysis. Psychometrika, 30,179-185, 1965.

Jackson DN. Personality Research Form. Port Huron, MI: Research Psychologists Press, 1967.

Jackson DN. A sequential system for personality scale development. In C.C. Spielberger (Ed.), Current topics in clinical and community psychology, (Vol. 2, pp. 61-96). New York: Academic Press, 1970.

Jackson DN. The dynamics of structured personality tests. Psychological Review, 78, 229-248, 1971.

Kristal AR, Shattuck AL, Henry AJ, Fowler AS. Rapid assessment of dietary intake of fat, fiber, and saturated fat. Validity of an instrument suitable for community intervention research and nutritional surveillance. American Journal of Health Promotion, 4, 288- 295, 1990

Long JS. Confirmatory factor analysis: A preface to LISREL. Newbury Park,CA: Sage, 1983.

Ounpuu S. Woolcott DM, Rossi SR Validation of a situational self-efficacy scale for dietary fat reduction. Paper presented at the Annual Meeting of the Canadian Dietetic Association, Banff, Canada, 1996, May.

Prochaska JO, Velicer WF, Rossi JS, Goldstein MG, Marcus BH, Rakowski W, Fiore C, Harlow LL, Redding CA, Rosenbloom D, Rossi SR. Stages of change and decisional balance for 12 problem behaviors. Health Psychology, 13, 39-46, 1994.

Rossi SR. Application of the Transtheoretical Model of Behavior Change to dietary fat reduction in a naturalistic environment. Unpublished doctoral dissertation. University of Rhode Island, 1993.

Rossi SR, Rossi JS, Prochaska JO, Velicer WF. Measurement structure of a decisional balance questionnaire for dietary fat reduction. Paper presented at the 101st annual convention of the American Psychological Association, Toronto, Ontario, Canada, 1993, August.

Velicer WF, DiClemente CC, Rossi JS, Prochaska JO. Relapse situations and self-efficacy: An integrative model. Addictive Behaviors, 15, 271-283.1990

Zwick WR, Velicer WF. Comparison of five rules for determining the number of components to retain. Psychological Bulletin, 99, 432-442, 1986.

TABLES AND FIGURES

Table 1
Stage of Change Using Algorithm 1 (Belief & Intention Criterion Alone)

Stage	N	%
Precontemplation	27	15.0
Contemplation	39	21.7
Preparation	25	13.9
Action	44	24.4
Maintenance	45	25.4

Table 2
Stage of Change Using Algorithm 2 (30% Criterion)

Stage	N	%
Precontemplation	29	16.1
Contemplation	71	39.4
Preparation	47	26.1
Action	24	13.3
Maintenance	9	5.0

Table 3
Stage of Change Using Algorithm 2 (25% Criterion)

Stage	N	%
Precontemplation	29	16.1
Contemplation	72	40.0
Preparation	51	28.3
Action	23	12.8
Maintenance	5	2.8

Table 4

Scale Means, Standard Deviations and Alphas for Study Three Transtheoretical Based Dietary Fat
Reduction Instruments

Scale	N	Mean	SD	Alpha
Decisional Balance				
Pros	177	4.16	0.83	.86
Cons	178	2.36	0.85	.67
Processes of Change 33 item scale				
Consciousness Raising	177	3.15	0.99	.80
Dramatic Relief	176	2.54	1.05	.80
Self Reevaluation	176	3.57	0.95	.79
Self Liberation	176	3.24	1.02	.83
Environmental Reevaluation	175	3.14	1.06	.83
Social Liberation	171	3.45	0.86	.74
Helping Relationships	173	2.64	1.08	.77
Reinforcement Management	175	2.14	0.91	.68
Interpersonal Relationships	176	1.80	0.86	.77
Counterconditioning	176	2.27	0.95	.76
Stimulus Control	177	2.49	0.81	**.43**
Processes of Change 22 item scale				
Consciousness Raising	178	3.06	1.08	.74
Dramatic Relief	176	2.55	1.15	.80
Self Reevaluation	178	3.50	1.03	.74
Self Liberation	178	3.18	1.10	.81
Environmental Reevaluation	178	3.31	1.30	.77
Social Liberation	175	3.62	0.87	.58
Helping Relationships	173	2.63	1.15	.77
Reinforcement Management	177	2.03	1.00	.66
Interpersonal Relationships	179	1.91	0.95	.70
Counterconditioning	177	2.11	1.03	.77
Stimulus Control	178	2.31	1.03	.63
Temptation				
Overall Temptation	178	2.68	0.87	.88
Positive Social Situations	180	2.93	1.03	.83
Negative Affective Situations	179	2.24	1.14	.90
Difficult Situations	178	2.84	1.02	.81

Table 4 Continued
Scale Means, Standard Deviations and Alphas for 9 item 3 factor Transtheoretical Based Dietary
Fat Reduction Instrument

Scale	N	Mean	SD	Alpha
Self-Efficacy				
Overall Confidence	178	3.02	0.80	.90
Positive Social Situations	179	3.02	0.93	.87
Negative Affective Situations	179	3.25	0.94	.92
Difficult Situations	179	2.80	0.87	.82

Table 5
Comparison of Processes of Change Internal Consistency Analyses (Coefficient Alpha)

2 Item Process of Change	Alpha African-American Women			Alpha White
	Focus Groups	Sample2	Sample3	
Consciousness Raising	.84	.77	.74	.65
Dramatic Relief	.76	.79	.80	.72
Self-Reevaluation	.91	.83	.74	.82
Self-Liberation	.86	.81	.81	.81
Social Liberation	.78	.64	.77	.70
Environmental Reevaluation	.64	.68	.58	.77
Helping Relationships	.87	.69	.77	.50
Reinforcement Management	**.47**	.63	.66	.74
Interpersonal Systems Control	.82	.74	.70	.69
Counterconditioning	.84	.82	.77	.64
Stimulus Control	.61	**.48**	.63	.61

Table 6
The Group Centroids and Ordered Structure Matrix of the Pooled Within-Groups Correlations Between the Discriminating Variables and the Significant Canonical Discriminant Function for the Pros and Cons.

Group Centroids				Ordered Structure Matrix	
Group	Stage	Function 1			Function 1
1	PC	0.54		Pros	-0.**34**
3	P	0.37		Cons	0.**83**
2	C	0.34			
4	A	-0.34			
5	M	-0.34			

SD = Standard Deviation   PC = Precontemplation   C = Contemplation
P = Preparation   A = Action   M = Maintenance

Table 7
Means and Standard Deviations in T Scores for the Pros and Cons By Stage of Change

		Pros			Cons	
Stage	N	Mean	SD	N	Mean	SD
PC	27	43.84	11.58	27	52.69	11.64
C	39	48.79	10.70	39	53.85	10.77
P	24	51.49	6.56	25	51.00	9.10
A	43	51.04	9.56	43	48.57	8.91
M	44	53.03	8.84	45	45.95	8.20

SD = Standard Deviation   PC = Precontemplation   C = Contemplation
P = Preparation   A = Action   M = Maintenance

Table 8
The Group Centroids and Ordered Structure Matrix of the Pooled Within-Groups Correlations Between the Discriminating Variables and the Significant Canonical Discriminant Function for Overall Temptation and Overall Confidence.

		Group Centroids				Ordered Structure Matrix	
Group	Stage	Function 1	Function 2			Function 1	Function 2
1	PC	-0.51	-.40	Confidence		0.88	0.47
3	P	-0.31	-.03	Temptation		-0.23	0.97
2	C	-0.32	.61				
4	A	0.53	.03				
5	M	0.25	-.12				

SD = Standard Deviation PC = Precontemplation C = Contemplation
P = Preparation A = Action M = Maintenance

Table 9
Means and Standard Deviations in T Scores for Situational Temptation By Stage of Change

Stage	PC		C		P		A		M	
Scale	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Temp	47.28	9.96	50.45	10.48	56.76	9.13	49.21	10.06	48.20	8.58
Pos/Soc	51.30	11.74	50.04	9.51	54.19	8.35	49.23	10.87	47.61	8.75
Neg/Aff	44.30	6.34	49.73	11.13	56.97	9.73	51.11	9.90	48.66	8.80
Diff	48.26	12.71	51.53	9.62	55.32	8.72	47.12	9.45	49.52	8.57

SD = Standard Deviation Temp = Overall Temptation
PC = Precontemplation Pos/Soc = Positive Social Situations
C = Contemplation Neg/Aff = Negative Affective Situations
P = Preparation Diff = Difficult Situations
A = Action
M = Maintenance

Table 10

Means and Standard Deviations in T Scores for Situational Self-Efficacy By Stage of Change

Stage	PC		C		P		A		M	
Scale	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Conf	51.09	12.47	49.05	9.48	46.90	8.22	50.54	10.01	51.57	9.94
Pos/Soc	49.97	11.14	48.65	10.58	47.84	6.92	51.23	10.31	51.38	9.94
Neg/Aff	52.97	11.75	49.78	10.21	46.63	8.96	49.23	10.40	51.03	8.50
Diff	49.66	13.28	49.11	9.08	46.68	9.07	51.31	8.94	51.57	9.88

SD = Standard Deviation   Conf = Overall Confidence/Self-efficacy
PC = Precontemplation   Pos/Soc = Positive Social Situations
C = Contemplation   Neg/Aff = Negative Affective Situations
P = Preparation   Diff   = Difficult Situations
A = Action
M = Maintenance

Table 11
The Group Centroids and Ordered Structure Matrix of the Pooled Within-Groups Correlations Between the Discriminating Variables and the Significant Canonical Discriminant Function for the Processes of Change 33 item Scale.

Group Centroids				Ordered Structure Matrix	

Group	Stage	Function 1		Function 1	
1	PC	-0.86		SL	0.82
3	P	-0.52		SR	0.67
2	C	-0.43		CR	0.62
4	A	0.29		SO	0.51
5	M	0.99		SC	0.47
				ER	0.46
				IP	0.29
				CC	0.23
				HR	0.16
				DR	0.16
				RM	-0.06

SD = Standard Deviation   CR = Consciousness Raising
PC = Precontemplation   DR = Dramatic Relief
C = Contemplation   SR = Self Reevaluation
P = Preparation   SL = Self Liberation
A = Action   ER = Environmental Reevaluation
M = Maintenance   HR = Helping Relationships
RM = Reinforcement Management
IP = Interpersonal Systems Control
CC = Counterconditioning
SC = Stimulus Control

Table 12

Means and Standard Deviations in T Scores for the 11 Processes (33 item) By Stage of Change

Stage	PC		C		P		A		M	
Process	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
CR	43.38	10.15	48.12	10.31	47.26	8.59	53.18	8.83	54.28	8.60
DR	48.20	9.54	47.43	9.34	53.51	10.89	50.11	10.72	51.31	9.16
SR	42.16	12.13	48.42	9.96	47.66	7.91	53.50	7.90	53.77	8.56
SL	42.92	10.70	46.67	9.38	47.28	9.36	52.96	8.95	55.91	6.93
ER	45.60	11.35	47.49	10.37	48.23	8.80	52.09	9.27	53.79	8.61
SO	46.61	10.23	44.90	9.51	49.96	7.93	52.89	9.63	53.80	9.48
HR	47.65	9.76	48.68	9.18	48.70	9.71	54.04	10.17	49.24	10.15
RM	48.16	10.60	50.96	9.09	50.50	9.90	52.38	10.93	47.69	9.26
IP	46.21	8.47	47.77	8.10	50.65	7.71	52.67	11.75	51.41	10.92
CC	45.72	10.66	47.98	8.76	51.21	7.89	54.24	9.75	49.51	10.65
SC	44.86	9.71	48.43	10.02	48.01	8.85	52.11	9.59	53.54	9.74

SD = Standard Deviation   CR = Consciousness Raising
PC = Precontemplation   DR = Dramatic Relief
C = Contemplation   SR = Self Reevaluation
P = Preparation   SL = Self Liberation
A = Action   ER = Environmental Reevaluation
M = Maintenance   HR = Helping Relationships
   RM = Reinforcement Management
   IP = Interpersonal Systems Control
   CC = Counterconditioning
   SC = Stimulus Control

Table 13
Means and Standard Deviations in T Scores for the 11 Processes (22 item) By Stage of Change

Stage Process	PC Mean	SD	C Mean	SD	P Mean	SD	A Mean	SD	M Mean	SD
CR	44.18	10.30	48.06	11.17	46.90	8.22	53.58	8.86	53.56	8.14
DR	48.45	10.64	47.91	9.35	52.72	9.70	49.48	10.90	51.81	9.18
SR	42.59	11.05	48.17	9.65	47.71	9.48	54.08	7.75	53.25	8.99
SL	43.59	10.38	46.56	9.62	47.22	9.87	53.08	9.06	55.56	6.90
ER	46.13	10.35	48.01	9.35	48.70	7.26	51.82	8.22	52.96	7.40
SO	45.00	10.16	46.25	10.18	50.72	8.40	53.34	9.17	52.37	9.58
HR	48.20	9.25	49.20	8.94	47.93	9.62	53.31	10.45	49.59	10.72
RM	48.77	10.16	50.87	9.66	51.09	10.02	51.89	10.56	47.54	9.46
IP	46.05	8.11	48.08	9.17	50.70	8.10	52.63	11.46	51.15	10.51
CC	46.25	10.05	48.44	9.12	51.30	9.13	53.72	9.89	49.18	10.42
SC	45.11	9.36	48.74	10.40	47.57	8.82	51.75	9.77	53.63	9.46

SD = Standard Deviation
PC = Precontemplation
C = Contemplation
P = Preparation
A = Action
M = Maintenance

CR = Consciousness Raising
DR = Dramatic Relief
SR = Self Reevaluation
SL = Self Liberation
ER = Environmental Reevaluation
HR = Helping Relationships
RM= Reinforcement Management
IP = Interpersonal Systems Control
CC= Counterconditioning
SC = Stimulus Control

Figure 1

Decisional Balance of Dietary Fat Reduction in African-American Women Sample 3

High fat foods taste better.

Lower fat foods just don't have the flavor I'm used to.

Cutting down on fat involves giving up family traditions.

Eating lower fat foods would be too stressful right now.

01 .71
03 .67
05 .40
07 .51

a=.67 **CONS**

r=.037

a=.86 **PROS**

.81 02
.86 04
.80 06
.65 08

I would be healthier if I ate less fat.

I'd have fewer health risks if I ate lower fat foods.

I might live longer if I adopted lower fat eating habits.

Eating lower fat foods would help me control my weight

Null Model
Chi-Sq$_{(28)}$ = 470.59 (p = .000)
GFI   = 0.56
RMS = 0.292

2 factor, 8 item Correlated Model
Chi-Sq$_{(19)}$ = 47.40 (p = .000)
GFI   = 0.94
RMS = 0.066

Figure 2

Situational Temptation To Eat High High Fat Foods in African-American Women Sample 3

01	← Positive Social (a=.83)	While eating out at a restaurant with close friends.
04		While having a good time with friends at a party.
07		While enjoying the company of others at a picnic or barbecue.
02	← Negative Affective (a=.90)	When I have an argument with someone close to me and I feel upset.
05		During those times when I feel myself depressed about something.
08		On days when things are not going my way and I feel frustrated.
03	← Difficult (a=.81)	When it is a problem to substitute a low fat fat food for the high fat one I really want to eat.
06		In situations in which eating a low fat food is just too much trouble.
09		When it would be very difficult to substitute a low fat food because only high fat ones are available.

Positive Social ↔ Negative Affective: .48
Negative Affective ↔ Difficult: .52
Positive Social ↔ Difficult: .76

9 item scale a=.88

3 factor, 9 item Correlated Model
Chi-Sq$_{(24)}$ = 48.37 (p = .000)
  GFI = 0.94
  RMS = 0.040
  CFI = .97

Null Model
Chi-Sq$_{(36)}$ = 1892.27 (p = .000)
  GFI = 0.36
  RMS = 0.420

N=178

Figure 3

Hierarchical Situational Temptation Model
African-American Women Sample 3

Hierarchical Model
Chi-Sq$_{(18)}$ = 48.37 (p = .000)
  GFI = 0.94
  RMS = 0.040
  CFI = .98

Null Model
Chi-Sq$_{(36)}$ = 1892.27 (p = .000)
  GFI = 0.36
  RMS = 0.420

Figure 4

Situational Self-Efficacy To Resist Eating High Fat Foods in African-American Women Sample 3

48

Figure 5
Hierarchical Situational Self-Efficacy Model
African-American Women Sample 3
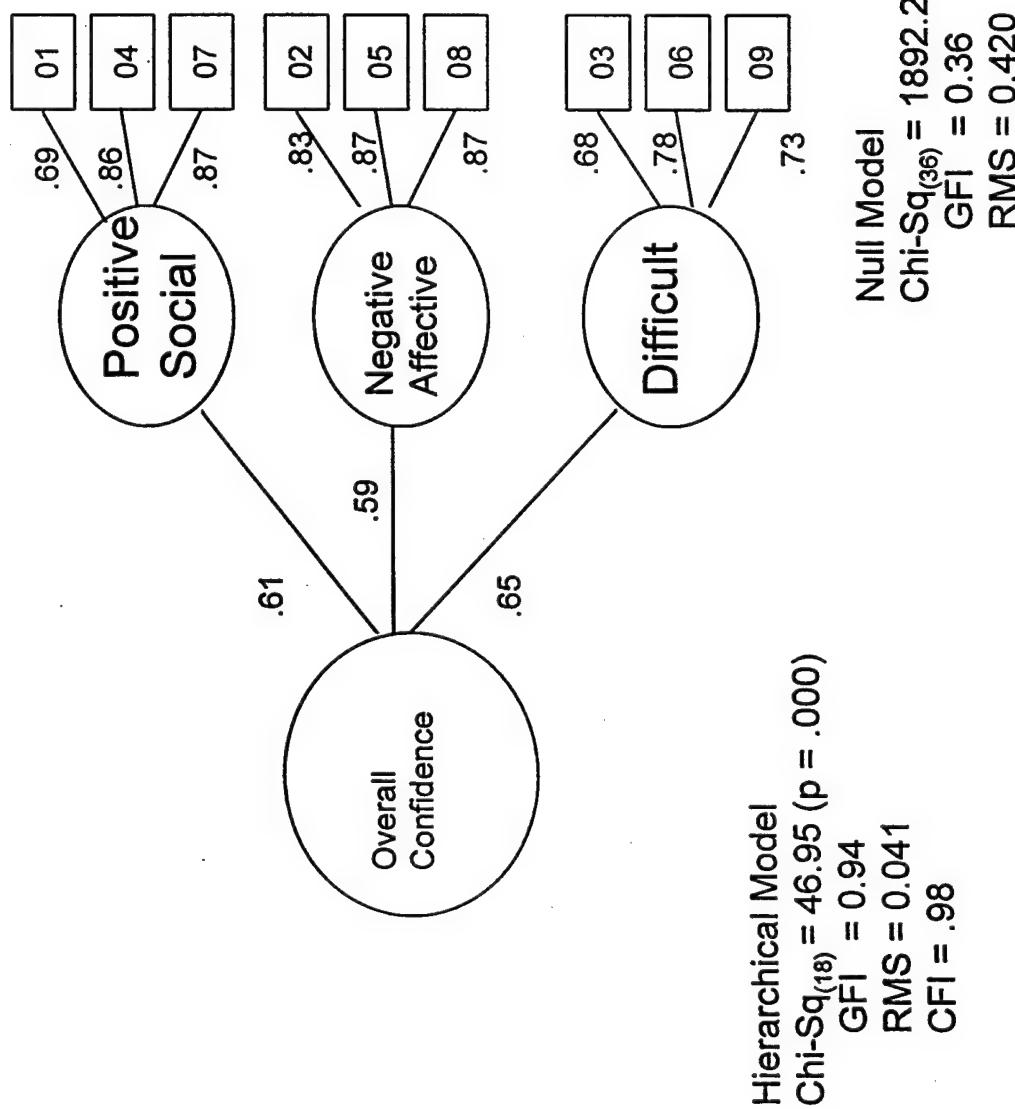
Figure 6
Processes of Change For Dietary Fat Reduction in African-American Women (33 Items) Sample 3
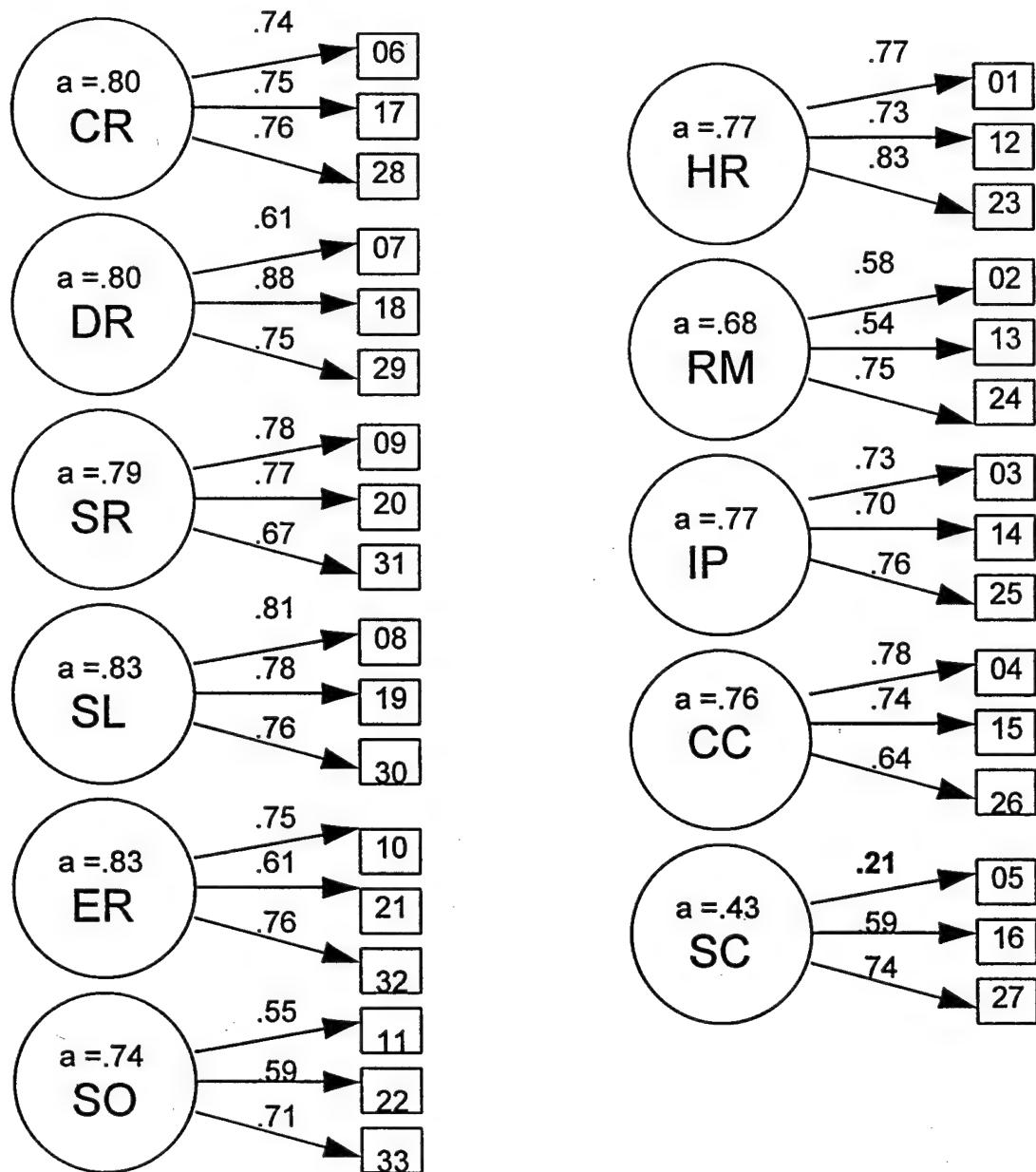
11 Factor, 33 item Correlated Model
Chi-Sq$_{(440)}$ = 664.87 (p = .000)
GFI = 0.82
RMS = 0.056
CFI = .93

Null Model
Chi-Sq$_{(528)}$ = 3669.74 (p = .000)
GFI = 0.199
RMS = 0.34

Figure 7
Hierarchical Processes of Change For Dietary Fat Reduction in African-American Women (33 Items) Sample 3
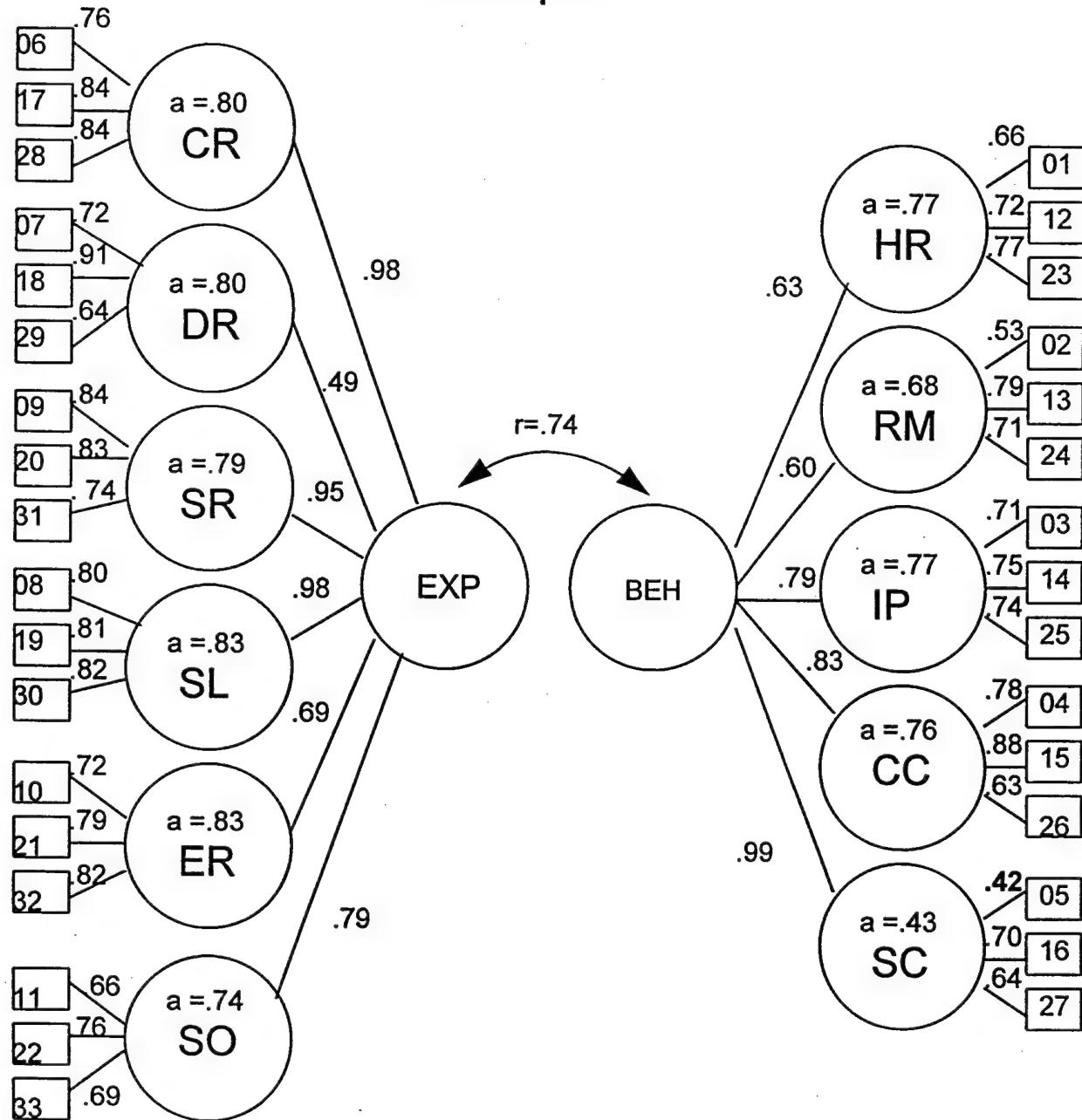
11 Factor, 33 item Hierarchical Model

Chi-Sq$_{(483)}$ = 735.00 (p = .000)

GFI = 0.78

RMS = 0.078

CFI = 0.91

Null Model

Chi-Sq$_{(528)}$ = 3669.74 (p = .000)

GFI = 0.199

RMS = 0.34

Figure 8
Processes of Change For Dietary Fat Reduction in African-American Women (22 Items) Sample 3
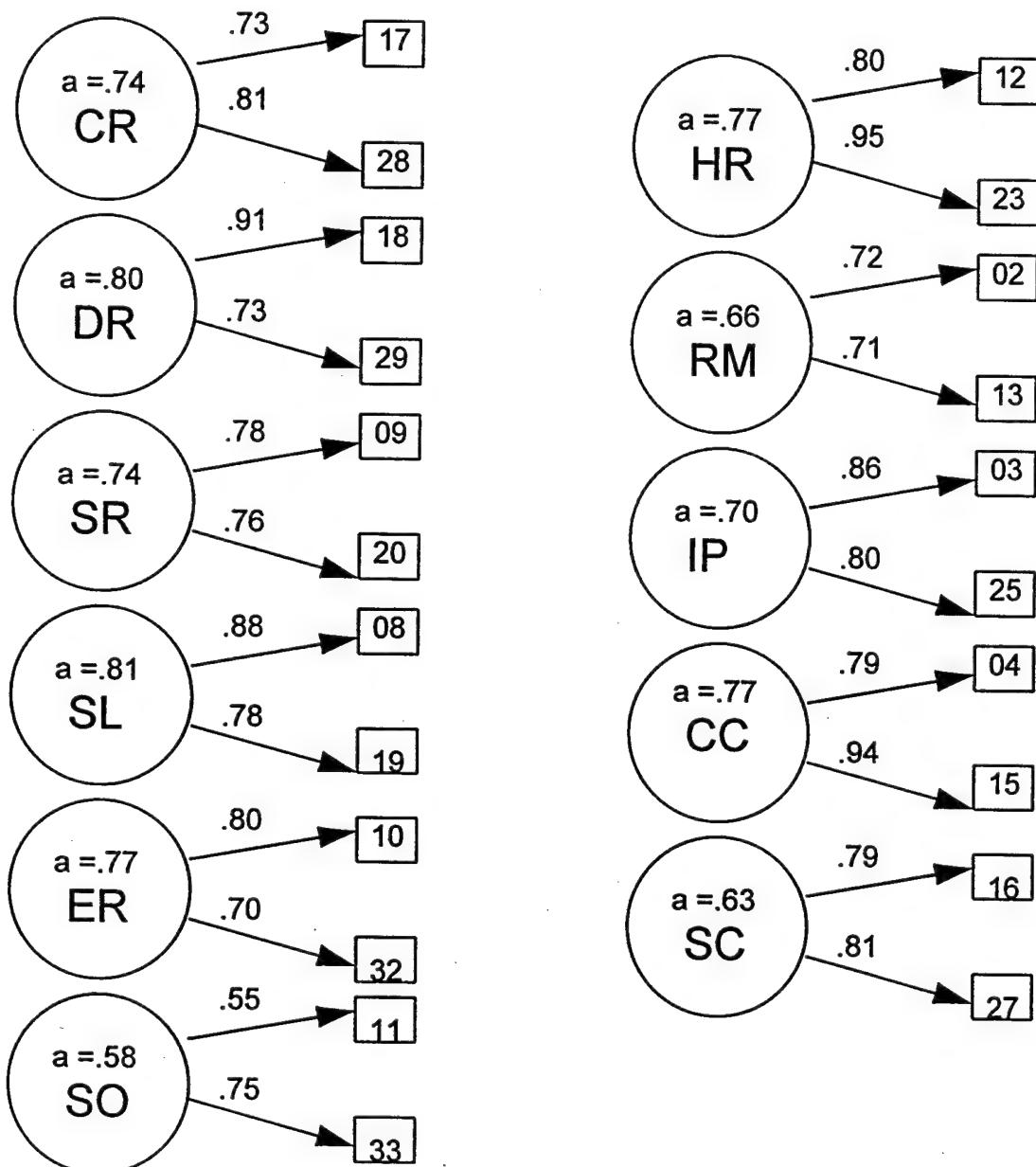
11 Factor, 22 item Correlated Model
Chi-Sq$_{(154)}$ = 240.52 (p = .000)
        GFI   = 0.89
        RMS = 0.050
        CFI = .94

Null Model
Chi-Sq$_{(231)}$ = 1711.74 (p = .000)
        GFI   = 0.317
        RMS = 0.306

Figure 9
Hierarchical Processes of Change For Dietary Fat Reduction in African-American Women (22 Items) Sample 3
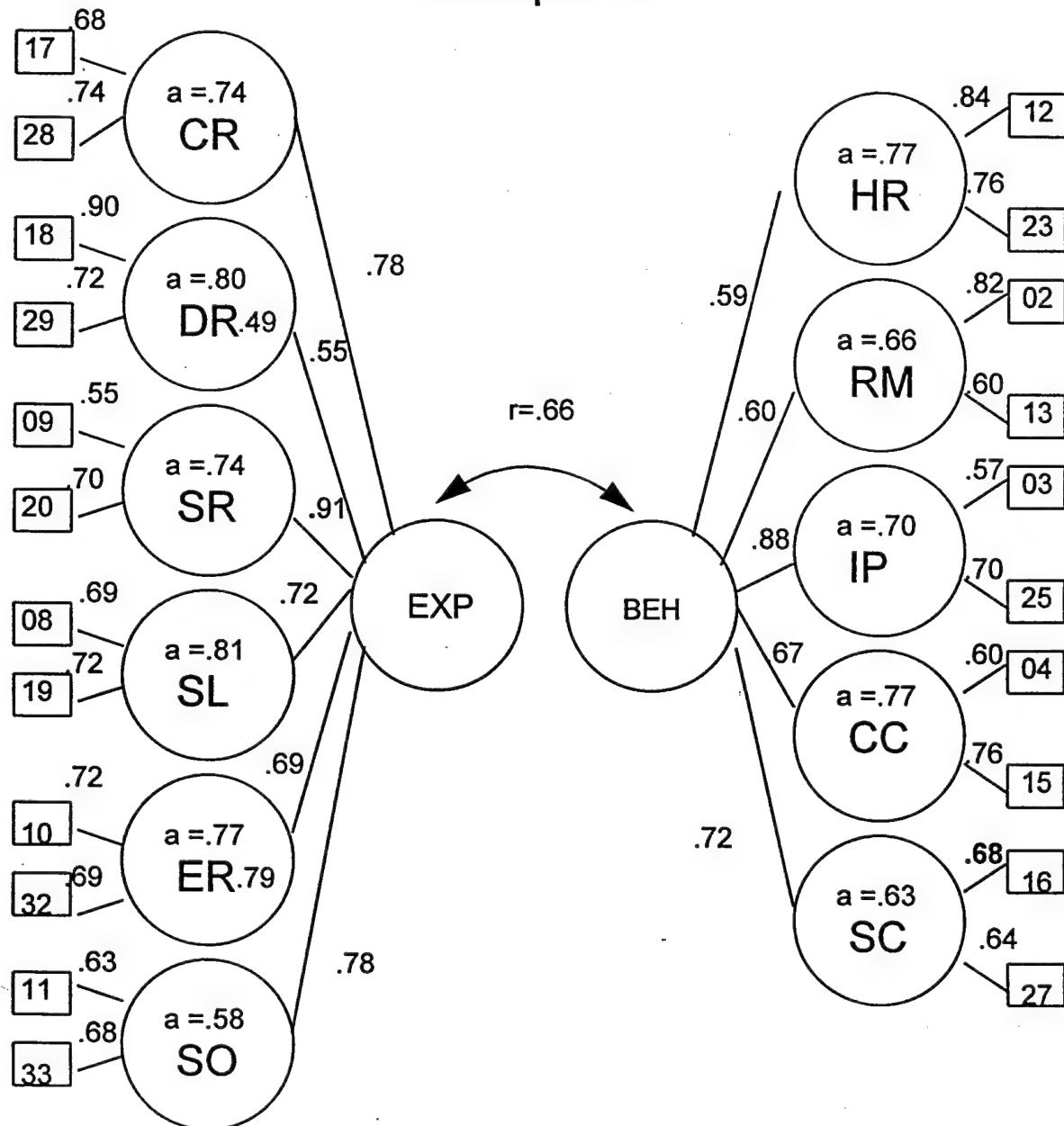
11 Factor, 22 item Correlated Model
Chi-Sq$_{(207)}$ = 457.28 (p = .000)
GFI = 0.80
RMS = 0.119
CFI = .83

Null Model
Chi-Sq$_{(231)}$ = 1711.74 (p = .000)
GFI = 0.317
RMS = 0.306

Figure 10

Pattern of Pros and Cons By Stage

Dietary Fat Reduction Sample 3

African-American Women
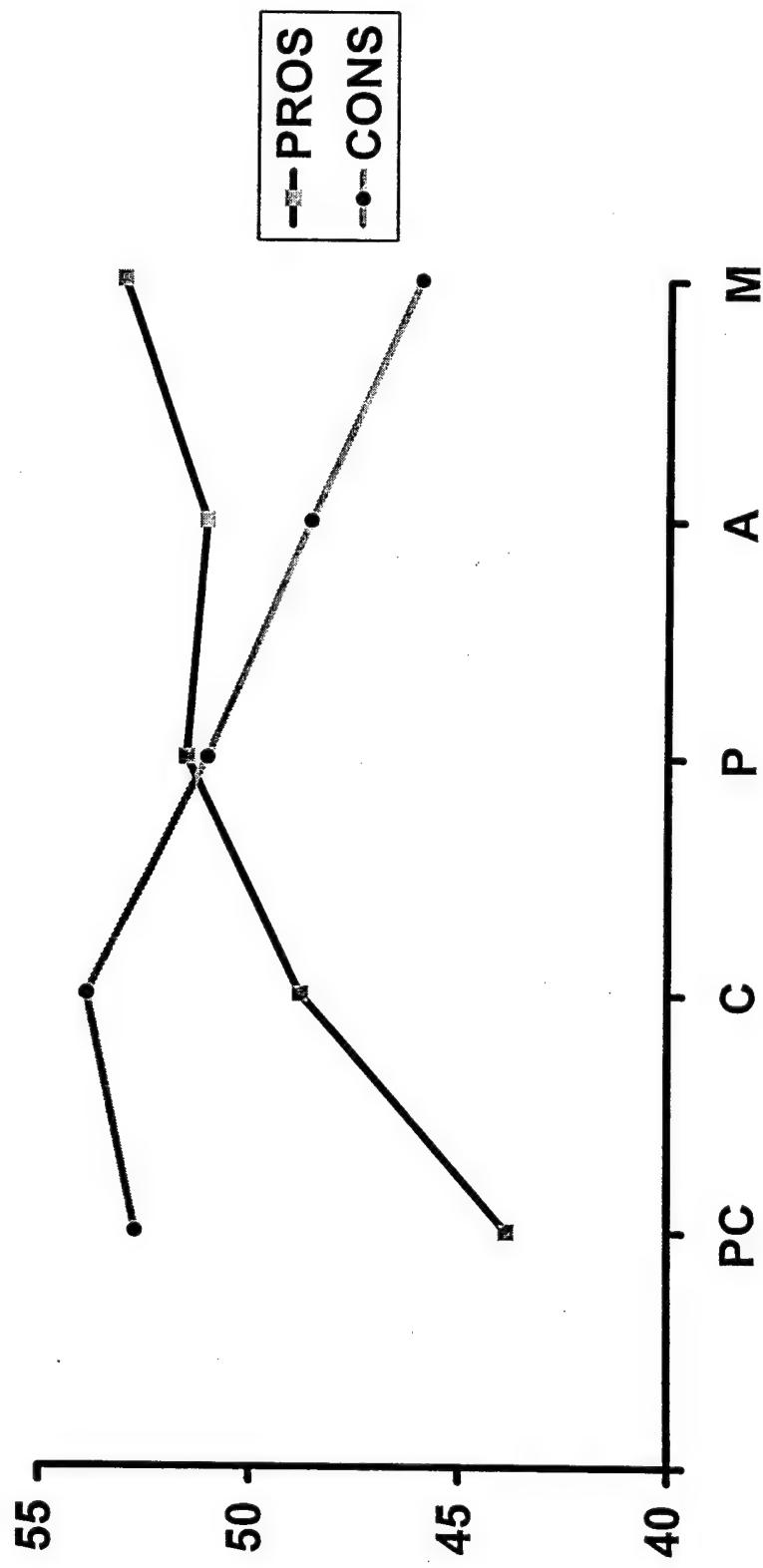
Figure 11
Pattern of Situational Temptation and Confidence
By Stage of Change Sample 3
African-American Women 9 Item
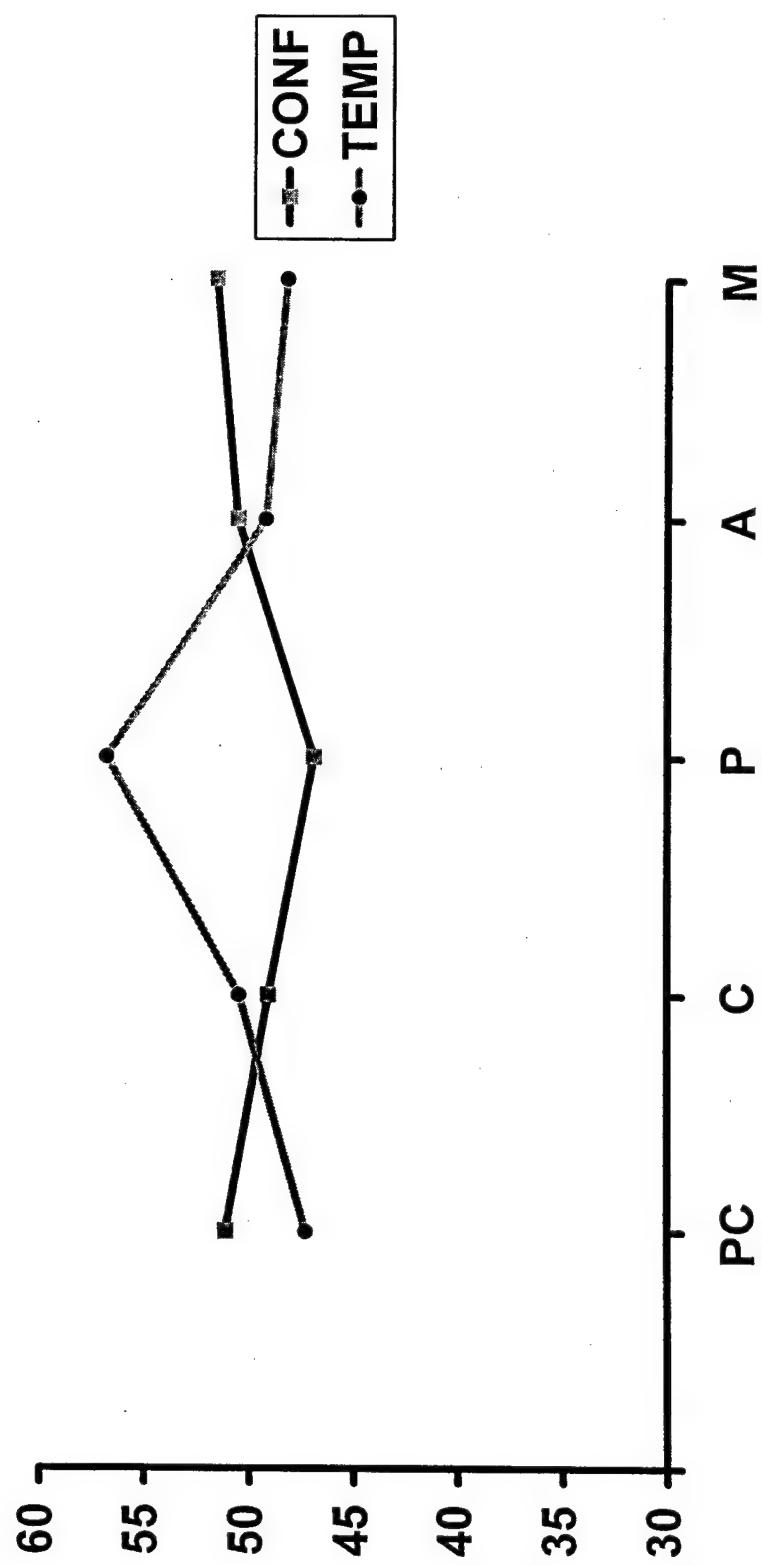
Figure 12

Pattern of Processes of Change By Stage
Dietary Fat Reduction Sample 3
African-American Women
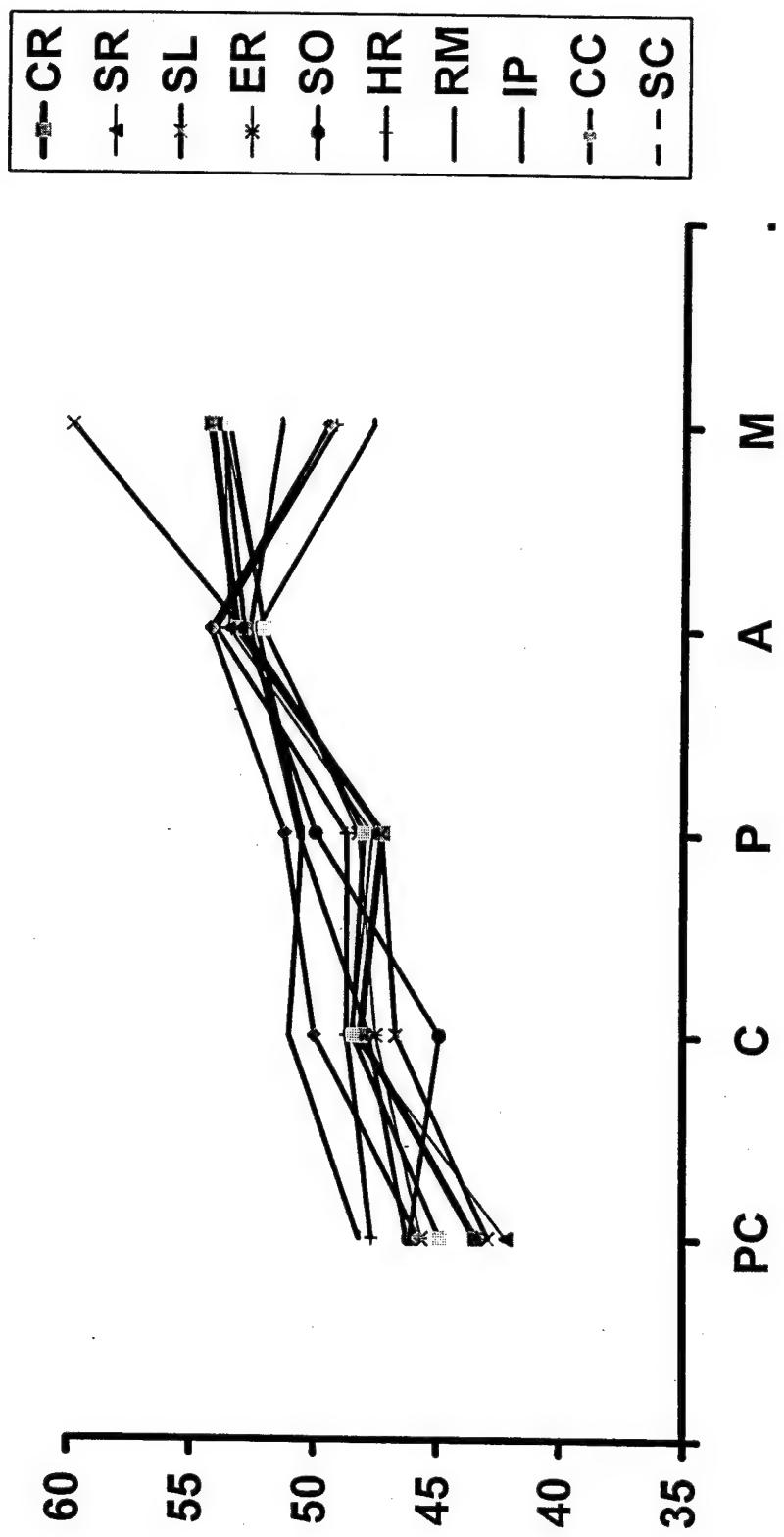
Figure 13

Pattern of 11 Processes of Change By Stage

22 Item Scale Dietary Fat Reduction Sample 3

African-American Women
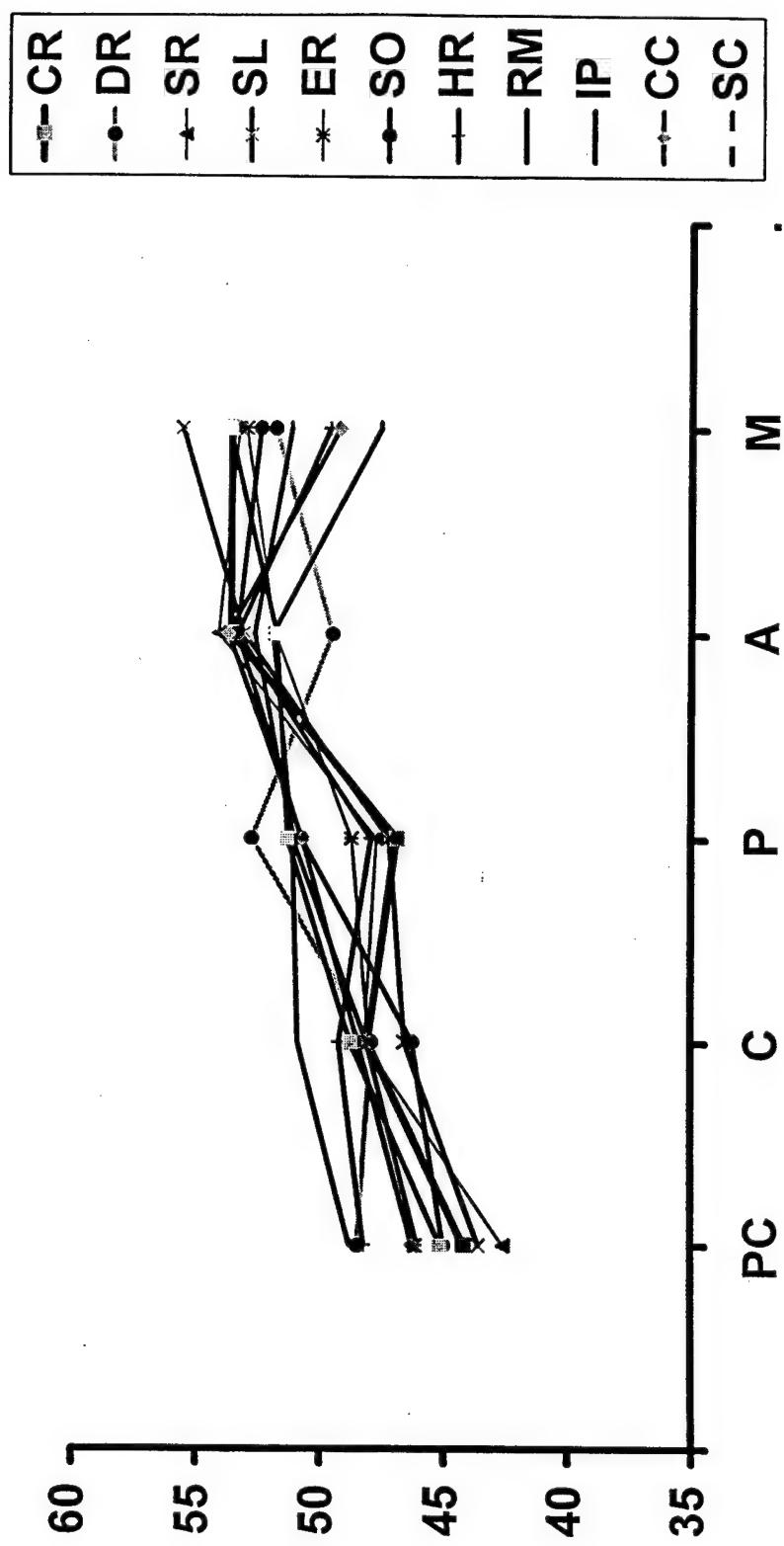
PILOT INTERVENTION

TABLE OF CONTENTS
Pilot Intervention

Objective

To test a culturally-sensitive intervention to reduce dietary fat intake to <30 percent of calories in African American women.

Methodology

Target Population

Recruitment

Subjects were drawn from the lists of eligible women in our files of people at HBCU's, sororities, and members of Senior Citizen Homes (n=1974) who had not participated in earlier project activities. Posters was mounted in strategic locations to attract new participants, and several churches were contacted directly.

Sampling

Subjects were placed in the Experimental or Control group using a Stratified Random Sampling Scheme (1). Stratification was done using the baseline status of their stage of change levels.

The Intervention Protocol

Program Design

To evaluate the effectiveness of the intervention, a baseline assessment was done before the intervention, and a final assessment was done after the intervention. Two baseline assessments were done, the first in October-November 1997, and the second one in March-April 1998. This was done because of the length of time taken to sign up the subject participants, and because of the intervening Thanksgiving, Christmas, and New Year holidays. The experimental group received an intensive intervention based on Transtheoretical Model Behavior Change Principles, and the Control group received a minimal information dissemination intervention.

From May 1-17, subject folders were prepared (see procedures and educational materials for each stage-of-change in Appendices C and D). The following activities were implemented for the experimental and control groups.

Experimental Group:

Activity #1	October-November 97	Baseline assessment #1
	March-April 98	Baseline assessment #2
Activity #2	May 19-22	Lecture sessions
Activity #3	June 26	Mailing
Activity #4	July 6-10	Telephone calls
Activity #5	July 16-19	Food Fare
Activity #6	July 27-30	Mailing
Activity #7	August 1-September 7	Final Assessment

Control Group

Activity #1	October-November 97	Baseline Assessment #1
	March-April 98	Baseline assessment #2
Activity #2	June 5	Mailing
Activity #3	June 26	Mailing
Activity #4	July 27	Letter
Activity #5	August 1-September 7	Final Assessment

Program Content

Experimental Group

Program content for the experimental group was based on Transtheoretical Model (TTM) principles that had been described in the Second Annual Report (Appendix C). Focus Groups described in that Report had indicated that meetings, mailings, and telephone calls would be acceptable modes for conducting the intervention. Printed materials appropriate for each stage of change were also recommended at that time.

Major features of this program included lecture sessions by stage of change, a video on "Targeting Cancer in Blacks", and a Food Fare tasting session where all stages were brought together. The sessions were conducted by the Principal Investigator. The outline for the lecture sessions is provided in Appendix D. During the sessions the following were provided - a breast cancer pin, individual dietary intake and laboratory results, commitment and dietary assessment forms for completion, colorful printed materials, including ones especially prepared with the help of the Cancer Information Service (CIS) that were directed at each stage of change. Discussion was focused on activities that would assist participants in moving up one stage of change, tips for managing at that specific level of change, and a wrap up.

The Food Fare included test tasting of low fat foods such as oven-fried fish, oven baked chicken coated in corn flake crumbs, vegetable and fruit trays, low fat sweet potato and banana bread, and crystal light low calorie beverages. As well, special foods were introduced, such as lemon juice, mineral water, an 80-calorie reducing milk beverage, low fat cream and yellow cheese, and low fat yogurt. Also made available were measurements of body weight/height, blood cholesterol by the portable Reflotron instrument, and body fat by the bioelectrical impedance measure. A cookbook was distributed, including low fat-low calorie food preparation of meats, vegetables, salads, breads and beverages. Tips for healthy living were included on controlling fat and cholesterol, what to eat and how much per day, how much is a serving, healthy snacks, common food equivalents, and caloric equivalents of some common foods. The cookbook was developed by Research Medical Assistant Deborah Welch, Program Coordinator/Health Educator Harlyn Hardin, and the Principal Investigator.

The experimental group received two mailings. The first on June 26 was a follow up to the lecture sessions, and included brochures on "Get a New Attitude to Cancer", Targeting Cancer in Blacks", and Snack Your Way to Five a Day". An "Update" Flyer was also sent to determine if they had used any of the material included in their folders in May. The second mailing was a follow-up to the Food Fare, enclosing two recipes for their cookbook, and requesting their attendance at the final assessment to provide a fasting blood sample. One telephone call was made to participants in the experimental group between July 6th and 10th to ask if they had read through their packets, had taken any action, and had any questions or concerns.

Control Group

The control group received three mailings. The first, sent on June 5, included a cover letter with fat intakes, fiber intakes, and cholesterol/HDL ratios – measured and recommended, and brochures, including "Do the Right Thing - Get a Mammogram" bookmark, "Targeting Cancer in Blacks", "Cancer Facts for Men and Women", and "Choices for Good Health". The second mailing included "Guidelines for the Early Detection of Breast Cancer", "Cancer Facts for Women", "Being There –A Message to Our African American Sisters" from the African American Breast Cancer Alliance, and a "Targeting Cancer in Blacks" poster. All were colorful

and attractive materials. The third letter was a note of thanks for their participation in the study, a hope that they had had a chance to read the materials sent to them by mail, and an invitation to give one last fasting blood sample for completion of project activities.

Evaluation

Outcome measures included dietary fat, dietary fiber, stages of change, and biochemical indicators – HDL, LDL, cholesterol, triglyceride, and breath fiber. Estradiol was collected only at baseline. Process measures were also conducted on the transtheoretical model constructs and food group intakes to determine qualitative differences between the experimental and control groups.

Dietary Intake Methods

Fat and Fiber Intake

The Dietary Quick Screen Questionnaire (2) was used to estimate percent of energy from fat and usual daily intake of dietary fiber in grams. The questionnaire consists of a list of 20 foods from which the respondent indicates which ones were consumed at least five times per week during the last year. From a list of 30 foods, the respondent indicates which ones have been consumed at least once per week over the past year. Three additional questions ask about the frequency of red meat consumption, whether fat is trimmed from meat, and the extent of use of butter on bread. The scoring of the instrument is based on sex- and age-specific regression equations to calculate percent of energy from fat and grams of daily fiber intake.

Food Groups by Eating Styles Questionnaire (ESQ) Analysis

An ESQ consisting of sixteen items represented behaviors associated with the reduced fat intakes among our earlier samples of African American women (3). The ESQ was derived from data collected through the Quick Screen Questionnaire, using a hierarchical cluster analysis. The questionnaire items were based on the 14 clusters that best discriminated between groups "not trying" to change, and groups "compliant" and "not compliant" with the <30% fat standard for dietary intake. The respondent indicated how often each statement described her eating behavior on a 5-point scale (1=never to 5=always). A repeated measures analysis of variance (4) was used to do an item-wise food group analysis, to determine the extent to which different food groups were selected by the experimental and control groups.

Biochemical Measures

Sample Collection

Five ml. of serum were drawn from subjects after an overnight fast of at least 18 hours. The sample was frozen and transmitted to a commercial laboratory (Quest Diagnostics).

Serum Lipids

High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Cholesterol, and Triglycerides were determined by Quest Diagnostics, using standard licensed procedures.

Serum Estradiol

Serum estradiol was determined by Quest Diagnostics, using standard licensed procedures.

Breath Fiber (3)

Plastic bags were used for gas collections. Breath samples were analyzed for hydrogen and methane within 6 hours by gas chromatography (Quintron Microlyzer, model DP, Milwaukee, WI). Gas chromatography has been designed to measure trace concentrations of hydrogen (H_2, μ/L) and methane (CH_4, 0-75μ/L) in expired (alveolar) air samples in the presence of trace amounts of other biologically produced reducing gases. Calibration was performed with a standard gas (Quintron Instrument Company, Milwaukee, WI) with a hydrogen concentration of 99 μ/L and with a methane concentration of 49μ/L. The results are an average of two analyses.

Outcome Data Analyses

Data were entered into an MS Excel Spreadsheet, then imported to an SPSS Program. Data were checked for errors and inconsistencies, then cleaned. The design of the intervention was pre-post, and with-without treatment method. A dummy variable – Group was used to identify the sample:

Group = 0 as Control
1 as Experimental

Three sets of outcome measures were collected: dietary intakes, stages of change and biochemical indicators. All outcome measures are interval or ratio variables except when stages of change were converted into an ordinal variable.

The Paired t-test (6) was used to compare baseline and final results.
Under the hypothesis:

H_o: $\mu_d = 0$; There is no difference between final and baseline results,

H_a: $\mu_d > 0$; There is a positive change between final and baseline results,
the significance level for one-tailed test is $\alpha = .05$

Formulae for $t = (d - \mu_d) / (S_d / \sqrt{n})$
Where $d_i = f_i - b_i$
f_i: the measurements at final
b_i: the measurements at baseline
$S_d^2 = [\Sigma d_i^2 - \{(\Sigma d_i)^2 / n\}] / (n-1)$

The Z test or t-test (7) was used to compare the group results.
Under the hypothesis:

H_o: $\mu_e - \mu_c = 0$; There is no difference between Experiment and Control at the baseline or at the final outcome measures,

H_a: $\mu_e > \mu_c$; There is a positive change between Experiment and Control final outcome measures,
the significance level for the one-tailed test is $\alpha = .05$

Formulae for $t = (X_e - X_c) / S* \sqrt{\{(1/n_e) + (1/n_c)\}}$
    Where

$\underline{X_e}$: mean of the measurements for Experiment group

$\underline{X_c}$: mean of the measurements for Control group

$S^2 = [(n_e-1)S_e^2 + (n_c-1)S_c^2] / (n_e + n_c -2)$

$S_e^2 = [\sum X_e^2 - \{(\sum X_e)^2/n_e\}] / (n_e-1)$

$S_c^2 = [\sum X_c^2 - \{(\sum X_c)^2/n_c\}] / (n_c-1)$

Effect Size was calculated for several outcome variables; formulae and description of its significance are given below.

A Sign Test for paired observation was used (8). The signs of differences between final and baseline measurements were recorded. The test statistic is the number of times that the least frequent sign occurs.

   N_+ : is number of positive movements

   N_- : is number of negative movements

   N : is number of nonzero movements

Statistic R = the smaller of N_+ and N_-

   F = cumulative probability = $(1 - \alpha)$

Critical value $Z_\alpha = (\mu - r_F)/\sigma$. Where: $\mu = N/2$; $\sigma = \sqrt{N}/2$

Stage-of-Change Analyses
    Stage of Change
    The subjects' stage-of-change was determined, using the culturally-sensitive algorithm developed by our team (4).   The algorithm consisted of three steps:
    Step 1:   classifies subjects based on intention alone into one of five stages – precontemplation (PC), contemplation ©, preparation (P), action (A), and maintenance (M).
    Step 2:   re-classifies subjects in A and M stages from step 1 who are eating >30% of calories from fat, using a behavioral marker question.   This question asks subjects to judge their adherence to five target low fat dietary behaviors assessed to be associated with successful dietary fat reduction by African American women in our first study.
    The stage of change algorithm was administered to all subjects so that they could be classified into one of five stages of change: Precontemplation, Contemplation, Preparation, Action or Maintenance.   Three staging algorithms were considered initially: Intention alone (Algorithm 1), intention plus a 30% or less criterion (Algorithm 2) based on Quick Screen results, and intention plus a 25% or less criterion (Algorithm 2) based on Quick Screen results. Staging algorithm 2 was used for outcome results.

    Dietary Fat Intake – Effect Size
Consistent with our previous studies, the Dietary Quick Screen Questionnaire (2) was used to calculate percent of energy from fat.   Means, standard deviations and effect sizes (Cohen's d) were calculated for dietary fat consumption at baseline and final periods for control and

experimental groups respectively, and compared for differences. Effect sizes were calculated using Cohen's d which is the difference in the means divided by the average difference in the standard deviations (9).

$$\text{Cohen's d} \quad \frac{\underline{M}\text{outcome} \quad - \quad \underline{M}\text{baseline}}{(SD \text{ outcome.} + SD\text{Baseline}/2)}$$

The magnitude of an effect is considered to be small (0.2), medium (0.5) or large (0.8) in nature and can be expressed in terms of standard deviation units (9) to gage results. For example, 0.5 is a medium sized effect representing ½ a standard deviation change and 0.8, a large effect is just under a 1 standard deviation change.

TTM Assessments. – Effect Sizes

TTM assessments developed in the previous study were administered at baseline and follow-up post intervention. Means, standard deviations and effect sizes using Cohen's d (9) were calculated for each scale of the measures at baseline for control and experimental subjects, and compared at outcome for both groups respectively.

Decisional Balance.

This measure has a 2 factor, pros and cons structure and consists of 8 items. It was designed specifically for African-Americans and assesses benefits (pros) and costs (cons) of reducing dietary fat consumption.

Temptation.

This measure has a 3 factor lower order structure and a one factor higher order structure (overall temptation). The 9 item measure assesses overall temptation to eat high fat foods across three specific situations: positive/social situations, negative/affective situations and difficult situations.

Processes of Change.

The Processes of Change measure has an 11 factor structure and consists of 33 items. The measure assesses strategies and techniques which individuals engage in during attempts to reduce fat consumption. There is a 2 factor hierarchical structure of Experiential and Behavioral processes with 6 primary lower order processes: Consciousness Raising, Dramatic Relief, Self Reevaluation, Self Liberation, Environmental Reevaluation, and Social Liberation and 5 lower order primary processes: Helping Relationships, Reinforcement Management, Interpersonal Systems Control, Counter Conditioning, and Stimulus Control. Since this is the first time we have conducted a feasibility study on this population with the measure, we chose to employ the longer 33 item version and collect more data at this time. The advantage of the longer version is that it can always be reduced to the shorter 22 item version after the data has been collected.

Results

Target Population

A total of 200 subjects were planned, with 100 each for the experimental and control groups. Expecting an attrition rate of about 30%, 260 persons were initially contacted. After repeated contacts, 99 (38%) agreed to participate in the intervention, but only 85 (33)%) actually showed up at baseline. An extended recruitment period did not help to significantly increase the pool of interested subjects. This delay led to the need for two baseline measurement periods.

The comparability of experimental and control groups at baseline by age and education level is shown in Table 1. Mean age was 41 years, and mean education level was 16 years. The change in numbers by attrition as the program progressed is defined in detail in the stage of change analyses below.

Dietary Intake Data

Fat and Fiber

Dietary fat as a percent of calories remained unchanged in the control group after the intervention, but decreased significantly ($p < 0.04$) in the experimental group (Table 2). Daily dietary fiber in grams remained unchanged in the control group after the intervention, but increased significantly ($p < 0.01$) in the experimental group (Table 2).

Food Groups

Based on the ESQ, both experimental and control groups showed improvements in selection of some food groups over time, as follows:
1. avoiding high fat breads (nut-breads, biscuits and croissants) and choosing low fat bread (regular) (item #16, $p < 0.001$);
2. avoiding butter, margarine, gravy, regular mayonnaise, and salad dressings made with oil (item #8, $p < 0.001$);
3. choosing very lean cuts of red meat or cutting off the fat (item #6, $p < 0.05$); and
4. choosing baked, broiled, or boiled chicken without the skin instead of red meat (item #4, $p < 0.05$);

In general, the experimental group showed greater mean improvements than the control group, except for item #8, for which the control group showed greater improvement. In addition, the experimental group showed improvements both by time and group for eating five or more fruits and vegetables every day (item #9, $p < 0.11$), where the control group did not; while the control group showed an improvement by group for choosing low fat or fat-free snack foods (item #4, $p < 0.09$), where the experimental group did not. These improvements by group are marginal, and are due to the low power of the analysis based on the small sample size. It is noteworthy that there were no improvements in other food groups comprising the 16-item questionnaire, such as avoiding red meat, choosing low fat luncheon meats, buying low fat dairy products, eating greens without fatback, and not adding butter or margarine to grits.

Biochemical Indicator Data

The only significant improvement in indicator data was for HDL in the experimental group after the intervention (Table 3). There were no significant differences for LDL, cholesterol or triglycerides for either group after the intervention (Table 3). Baseline estradiol data were similar for experimental and control groups with an extremely high variability, providing justification for

not gathering final data for this indicator. Dietary fiber as measured by the breath test did not change in either the experimental or control groups (Table 2).

Mean Stage of Change Level

There was a significant improvement in mean stage of change level for both the experimental and control groups ($p<0.01$ vs $p<0.05$) after the intervention (Table 4). Thirty-two percent of experimental and twenty-eight percent of control subjects improved at least one stage of change ($p<0.05$ for both groups).

Stage-of-Change Analyses

Initial Total Respondent Sample.

Prior to intervention, 85 subjects were enrolled, consisting of 37 control and 35 experimental subjects. Seven subjects failed to return completed surveys, and 6 were lost to follow-up. Only 61 subjects completed both baseline and post intervention assessments, with 32 in the control group (52. 5 %) and 29 in the experimental (47.5 %) group. Initial summary data was analyzed on the 61 subjects for purposes of describing the responding sample. Responders ranged in age from 19 to 69 years with a mean age of 43 (SD = 12.57). Educational level ranged from 12-22 years, (M = 16 years, SD = 2.54). Dietary fat intake ranged from 23% to 47.1 % with a mean of 37.04% (SD = 5.34). Dietary fat intake for Black Women in this study was lower than in our previous studies, but was consistent with higher fat consumption than found in Whites (M = 32 % to 35 %) (10) using the same instrument. These data support dietary fat consumption as a high risk health behavior for African-American Women in particular. Subjects were primarily single (45.8 %) with an average income of $20,000 to $30,000.

Stage of Change for Initial Total Respondents.

Three stages of change algorithms were explored for this and subsequent stage of change analyses. Algorithm 1 consisted of a traditional algorithm based on beliefs and intentions about reducing dietary fat consumption alone as used by Curry et al (11) and others. The two other algorithms included beliefs and intentions about reducing dietary fat consumption but required the addition of behavioral criteria for staging subjects in action and maintenance as recommended by Greene et al (10). Algorithm 2 was based on an intake of 30% or less fat from total daily calories while Algorithm 3 was based on the target intake of 25% or less fat from total daily calories. Stage of change distributions at baseline for the total sample (N = 61) including experimental and control subjects is presented in Tables 5-7. Using the 25 % fat intake as a criterion, about two thirds of the sample had not yet taken action (Precontemplation, Contemplation, Preparation).

Subjects who had been identified as being in Action and Maintenance at baseline were then removed from all subsequent analyses to determine stage progression among pre-action subjects (Precontemplation, Contemplation and Preparation) for control and treatment groups, Thus, analyses were performed on the remaining 41 pre-action subjects (67.2%) who completed both baseline and post intervention assessments. The final sample consisted of 22 controls and 19 subjects in the experimental group.

Pre-Action Baseline Total Sample.

This sample consisted of 41 pre-action subjects consisting of 22 in the control (53.7%) and 19 (46.3 %) in the experimental groups. Summary data was analyzed on the 41 subjects for purposes of describing the pre-action sample. Subjects ranged in age from 19 to 63 years with a mean age of 41 (SD = 12.08). Educational level ranged from 12-22 years, (M = 16 years, (SD = 2.52). Dietary fat intake ranged from 31% to 47.1% with a mean of 38.12 % (SD = 4.62). Dietary fat intake for Black Women in this study was more similar to our previous studies, and consistent with higher fat consumption than found in Whites (M = 32 % to 35 %) (10) using the same instrument. These data continue to support dietary fat consumption is a high risk health behavior for African-American Women. One subject failed to provide marital status data. Subjects were primarily single (45%). Average income of the total sample was $20,000-30,000.

Stage of Change for Pre-Action Baseline Total Sample.

The 3 stages of change algorithms previously described were explored. Stage of change distributions at baseline for the pre-action total sample (Precontemplation, Contemplation, Preparation, N = 41) including experimental and control subjects is presented in Tables 8-10. Although subjects who had taken action had been removed from the analysis, 48.7% (n = 20) of subjects we had staged as pre-action using a both intention and behavioral criterion for fat intake believed they had taken action . The results are consistent with early stage of change algorithm studies and suggest that like Whites, Black women under-estimate their fat intake (10,12-14). Previous studies suggest that subjects may not be aware of hidden sources of fat in the diet (10).

Pre-Action Baseline Control Sample.

Data from the 22 pre-action subjects in the control group (53.7%) were analyzed separately and a description of this sample is presented here. Pre-Action control subjects ranged in age from 19 to 63 years with a mean age of 41 (SD = 13.48). Educational level ranged from 12-20 years, (M = 16 years, SD = 2.19). Dietary fat intake ranged from 32% to 46. 1 % with a mean of 37.67 % (SD = 4.43). Dietary fat intake for Black Women in this study was lower than in our previous studies, but consistent with higher fat consumption than found in Whites (M = 32% - 35%) (10), using the same instrument. These data continue to support dietary fat consumption is a high risk health behavior for African-American Women. Pre-Action control subjects were primarily single (54.5%, n = 12), with an average of $20,000-30,000.

Stage of Change for Pre-Action Control Group at Baseline

The 3 stages of change algorithms previously described were explored in the Pre-Action Control subjects. Stage of change distributions at baseline for the pre-action controls sample (Precontemplation, Contemplation, Preparation, N == 22) is presented in Tables 11-12. Stage distribution using the 25% fat intake criterion were identical to those reported in Table 11 for the 30% criterion. Slightly more subjects (50.0%, n = 11) we had staged as pre-action using a both intention and behavioral criterion for fat intake than the total Pre-Action sample believed they had taken action, although we had removed action and maintenance subjects from the analysis. These results are consistent with early stage of change algorithm studies and suggest that like Whites, Black women under-estimate their fat intake (10,12-14). Previous studies suggest that subjects may not be aware of hidden sources of fat in the diet (10).

Pre-Action Baseline Experimental Sample

Data from the 19 pre-action subjects in the experimental group (46.3 %) were analyzed separately and a description of this sample is presented here. Pre-Action experimental subjects ranged in age from 19 to 56 years with a mean age of 40 (SD = 10.58). Educational level ranged from 12-22 years, (M = 16 years, SD = 2.86). Dietary fat intake ranged from 31 % to 47.1 % with a mean of 39.83% (SD = 4.63). Dietary fat intake for Black Women in this study was similar to our previous studies and consistent with higher fat consumption than found in Whites (M = 32% to 35%) (10), using the same instrument. These data also support dietary fat consumption as a high risk health behavior for African-American Women. Pre-Action experimental subjects were split, with 1/3 of the sample (6) reporting single or divorced status, and a little less than 1/3 as married (27.8 %, n = 3). Average income was $20,000-30,000.

Stage of Change for Pre-Action Experimental Group at Baseline.

The 3 stages of change algorithms previously described were explored in the Pre-Action experimental subjects. Stage of change distributions at baseline for the pre-action experimental sample (Precontemplation, Contemplation, Preparation, N = 19 is presented in Tables 13-14. Stage distribution using the 25 % fat intake criterion were identical to those reported in Table 11 for the 30% criterion. Similar to the total Pre-Action sample, although subjects who had taken action had been removed from the analysis, 47.4% (n = 11) of subjects we had staged as pre-action using a both intention and behavioral criterion for fat intake believed they had taken action. These results are consistent with early stage of change algorithm studies and suggest that like Whites, Black women under-estimate their fat intake (10,12-14). Previous studies suggest that subjects may not be aware of hidden sources of fat in the diet (10).

Comparison of Baseline with Outcome Results
Dietary Fat Consumption

Figure 1 shows an encouraging finding between the Pre-Action experimental and control groups at baseline and outcome. The data show that dietary fat consumption for the Pre-Action control group did not change from baseline to outcome. The effect size (Cohen's d = 0.124) was less than 0.2, which is considered to be small (9). In contrast, subjects who received stage-matched interventions did experience a reduction in dietary fat consumption at outcome. The magnitude of this effect (Cohen's d = 0.919) was greater than 0.8, considered to be a large effect (9) and is interpretable as close to a 1 standard deviation difference. These results suggest that the stage-matched dietary interventions did have a positive effect on outcome.

Stage of Change

Pre-action (Precontemplation, contemplation, preparations data were examined for evidence of stage progression from baseline and outcome for subjects in the experimental and control groups. Stage of change distributions for control and experimental groups at outcome are presented in Tables 15-16. Stage movement occurred in both groups. Results for the two groups were similar at outcome with no discernible differences detected between the experimental and control groups for stage of change. There was no stage movement for the same number of subjects in both groups (experimental = 6, control = 6). Approximately the same number of

subjects progressed a single stage in both groups (experimental = 9, control = 7). Results were similar for the number of subjects who progressed 2 stages (experimental = 1, control = 1). The same number of subjects progressed a single stage in both groups (experimental   9, control = 7). Of those experimental subjects who were pre-action at baseline, 31.6% (n = 6) had moved to action at outcome, with 68. % (n = 13) remaining in pre-action. These result were similar to the pre-action control group who did not receive intervention, with 27.2 % (n = 6) of subjects taking action at outcome and 72.7 % remaining in pre-action stages.

TTM Constructs

Effect sizes calculated for TTM constructs at baseline for control and experimental subjects were examined for magnitude and direction as well as compared outcome for both groups respectively and are reported in Table 17. Means and standard deviations for TTM constructs are presented in Table 18. TTM constructs included pros and cons of decisional balance, temptation and self-efficacy, as well as the 11 processes of change (consciousness raising, dramatic relief, self-reevaluation, self-liberation, environmental re-evaluation, social liberation, helping relationships, reinforcement management, interpersonal systems control, counter   conditioning and stimulus control).

Pros and Cons of Decisional Balance

The TTM predicts that the pros of reducing dietary fat consumption should increase as stage of change increases (15). Examination of the effect sizes for the experimental and control groups show that the pros increased for the experimental group in accordance with model predictions while they decreased for controls. A medium size effect (Cohen's = 0.48) was found for the experimental group which translates to about a difference of a ½ standard deviation. Although preliminary, these results suggest that stage-matched dietary interventions did have a positive effect on outcome. The TTM predicts that the cons of reducing dietary fat consumption decrease as stage of change increases. While effect sizes for the cons were very small, comparison of results indicate that the cons were lower for the experimental group for the controls.

Overall Temptation and Self-efficacy

According to the TTM, situational temptation to eat high fat foods should decrease and while confidence (self-efficacy) to resist eating high fat foods should increase as stage of change increases (15). Effect sizes for the experimental and control groups were small for both temptation and confidence. While the effect size for temptation was less for the experimental group than for the controls, situational temptation went down for controls but not for those in the experimental group. In contrast, self-efficacy increased as the model predicts in the experimental group. The small sized effect found for the experimental group (Cohen's d = 0.321) was larger than in the control group where confidence did not increase at outcome. The preliminary results for self-efficacy suggest support for a positive effect of the stage-matched dietary interventions.

Processes of Change

Previous TTM research on dietary fat reduction has shown that in general, process use increases as stage of change increases (15). Effect sizes for 6 of the 11 processes of change were

greater for the experimental group than for controls. Large effects greater than 1 standard deviation were found for self-reevaluation (Cohen's d = 1.08) and environmental evaluation (Cohen's d = 1. 08). A medium to large sized effect was found for interpersonal systems control (Cohen's d = 0.679). Medium sized effects were found for consciousness raising (Cohen's d = 0.486), self-liberation (Cohen's d = 0.484), counter conditioning (Cohen's d = 0.591). A small effect was found for stimulus control (Cohen's d = 0.408). These preliminary results suggest that stage-matched interventions were effective in reducing dietary fat consumption in a population of Black women.

Discussion

There were small but significant improvements in key outcome and process variables for the experimental as compared with the control group, reflecting the impact of the intervention.. Outcome variables included fat intake as a percent of energy, fiber intake in grams, serum HDL, and stage of change level. Process variables included food group selection and stages of change construct variables. In some instances, the control group showed some improvements (HDL, food group selection, and stage of change variables). However, in most instances, the experimental group showed improvements in more variables than the control group, and greater improvements in the same variables as the control group. In interpreting and explaining these results, some perspectives are provided below.

Target Population

It is apparent that a highly selective group of people agreed to participate in the project. Of 260 contacted, only 38% (99) agreed to participate, and only 33% (85) actually showed up for baseline measures. Thus, those who participated probably had a strong interest in personal health, even though there were precontemplators and contemplators in the sample. Knowing the reasons for non-participation may assist in future recruitment efforts. Three percent declined for medical reasons, or because they were scared of being stuck with needles, or of giving blood; three percent declined without a specific reason, and five percent had left their place of work and could not be contacted. It is of interest that a total of fifty-one percent did not return any of three telephone calls, where a specific message had been left as a reason for the call. It is likely that a high percentage of this group could be classified as precontemplators and contemplators, and therefore, special messages should be developed to reach these persons for participation in helpful health programs. Precontemplators and contemplators participating in this program did move at least one stage of change.

The Intervention Protocol

The intervention lasted twelve weeks, the usual period for a feasibility intervention study. In accounting for the response in the control group, given their interest in health, the materials sent by mail must have had an impact. Minimal information was provided on the features of different cancers, as well as on cancer prevention by screening and by dietary methods. Materials were colorful, and of low literacy levels, and the group was left alone to assimilate information at their own speed. On the other hand, the experimental group was involved much more in the intervention program, and indications from the process data are that they heard and responded. Emphasis was placed on using fruits and vegetables as a positive way to affect dietary fat intake,

and on increasing "pros" for improving health practices, and decreasing "cons" that maintain the status quo.

Biochemical Indicators

The serum HDL lipid fraction was the most sensitive indicator, showing marginal improvements in both experimental ($p<0.05$) and control ($p<0.07$) groups. In interpreting the biochemical data, however, it should be remembered that the emphasis for the experimental group was in moving one stage at a time (Appendix C5). Since the largest percentages in the group were in the contemplation and preparation stages, it is not surprising that there was no improvement in most of the biochemical indicators. The breath fiber test was not easily administered, based as it is on the measurement of intestinal gas resulting from digestion of dietary fiber. Unless there is a major and constant change in fiber intake, increases will not show up in random testing. Consecutive and regular testing over time could improve on the use of this test. With respect to estradiol as a risk factor for breast cancer, there was wide variability over the age range and menopausal status of this target population. We are searching for a better indicator of breast cancer risk.

Process Measures

The process measures show important differences between the experimental and control group changes.

Food Groups

The ESQ was a useful tool in showing differences between the food items selected by the experimental and control groups. While group differences were marginal because of the small sample sizes, the experimental group reported selecting five or more fruits and vegetables per day ($p<0.11$) while the control group did not, and the control group reported choosing more low fat and fat-free snacks ($p<0.09$), while the experimental group did not. Both groups reported changes in four items which are probably easier for African Americans, such as adopting low fat chicken preparation methods ($p<0.05$); trimming fat from meats ($p<0.05$); avoiding butter, margarine, and high fat dressings (p.001); and avoiding high fat breads such as biscuits, croissants, and nut breads ($p<0.001$). The experimental group showed greater mean improvements in three of the four items; the control group showed a greater mean improvement in the butter and high fat dressings item only. There were no improvements in items believed to be more difficult for African Americans to handle, such as avoiding red meats, luncheon meats, greens with fatback, and grits with butter.

Transtheoretical Model Constructs

Using the Cohen's d statistic as an indicator of small (0.2), medium (0.5), and large effects, the following effects were observed

(1)   medium effects:

experimental group - pros (.477), consciousness raising (.486), self liberation (.484), counter conditioning (.591), and stimulus control (.408);

control group - self liberation (.418), dramatic relief (.375), social liberation (.432), and reinforcement management (.474).

(2)   **large effects**:

experimental group – self reevaluation (1.084), environmental reevaluation (1.083), and interpersonal relationships (.679);

control group - helping relationships (.916)

These data indicate that different processes were used by each group, with the exception of self liberation which was used to the same extent by both groups.   This *experiential process* makes use of willpower and commitment to engage in the behavior change.

Other *experiential processes* used by the *control group* included:
dramatic relief - motivation based on emotional experiences related to cancer, and
social liberation - awareness of environmental changes that can impact fat intake;
as well as *behavioral processes* of:
reinforcement management - using rewards to cut down on fat, and
helping relationships - using social supports to cut down on dietary fat.

Other *experiential processes* used by the *experimental group* included:
consciousness raising - raising awareness of dietary fat,
self reevaluation - reassessing thoughts, feelings and knowledge about dietary fat, and
environmental reevaluation - reappraising the impact that eating habits have on others;
as well as *behavioral processes* of:
counterconditioning - substituting thoughts or low fat foods for high fat ones,
stimulus control - avoiding situational cues to eat high fat foods, and
interpersonal relationships - avoiding cues to eat high fat foods that relate to other people.
As well, defining "*pros*" for change and a feeling of *self-efficacy* (cohen's d - .321) were additional differences that strengthened the experimental group.   Thus, the experimental group were making greater use of processes of the transtheoretical model as they sought to change their behaviors.

Value of this Pilot Study

This study was important in designing, implementing, and evaluating a first level intervention program to decrease fat intake and increase fiber intake in African American women. Although positive effects were seen in both experimental and control groups, it has been shown that the effects were greater in the experimental group.   The following limitations are noted for the study.

Limitations

Although generally positive, especially for a feasibility demonstration project, results should be considered preliminary due to a number limitations in the data. First and foremost, results are based on very small overall sample size resulting in a small and unequal number of subjects in the control and experimental groups. Such conditions generally severely reduce the power of a test to detect effects (9). Small sample sizes lower power to detect effects and

precluded the ability to perform the usual statistical analyses which might show significant differences between groups. Detection of intervention effects in the experimental group at outcome on the other TTM dimensions (pros, self-efficacy, processes of change) coupled with small sample sizes suggest that the lack of differences for stage of change may be due to a lack of power. In addition, the duration of the study was short. Previous TTM research has shown that effect of changes in stage can be delayed as they take time. Such stage effects have been known to occur up to 18 months post intervention (16). Another factor which may have lead to the lack of stage differences may have been due to a treatment effect in the control group. Both controls and experimental groups received TTM assessments twice at baseline during the study. TTM assessments have also been known to have a treatment effect in and of themselves.

A second limitation concerns differences that existed between the control and experimental groups at baseline. For example, dietary fat consumption was higher at baseline for experimental subjects than for controls. Controls were slightly older than the experimental group. The groups also differed with respect to marital status. Experimental subjects were primarily single while the marital status of controls varied more. A larger sample size would overcome these deficiencies.

References:
1. Mark RG. Designing a Research Project. Lifetime Learning Publications, 1986.
2. Kristal AR, Shattuck AL, Henry AJ, Fowler AS   Rapid assessment of dietary intake of fat, fiber, and saturated fat.   Validity of an instrument suitable for community intervention research and nutritional surveillance. American Journal of Health Promotion 4, 288-295, 1990.
3. Breath fiber – Quintron Manual, 1998.
4. Hargreaves MK, Schlundt DG, Buchowski MS, Hardy RE, Rossi S, Rossi JS.   Stages of change and the intake of dietary fat in African American women: Improving stage assignment using a new eating styles questionnaire.   Accepted, J. Amer. Diet. Assn.
5. Walker GA.   Repeated Measures ANOVA: In Common Statistical Methods for Clinical Research, page 87-113, SAS Institute Inc., 1997.
6. Daniel WW.   Paired Comparisons: In Biostatistics, a Foundation for Analysis in the Health Sciences, page 217-220, John Wiley & Sons, Inc., 1987.
7. Ott L.   Independent Sample Mean Test: In An Introduction to Statistical Methods and Data Analysis, page 138-143, PWS Publishers, 1984.
8. Daniel WW.   The Sign Test: In Biostatistics, A Foundation for Analysis in the Health Sciences, page 586-593, John Wiley & Sons, Inc., 1987.
9. Cohen, I. (1988). Statistical power analysis for the behavioral sciences (2nd ed.) Hillsdale, NJ: Lawrence Erlbaum.
10. Greene GW, Rossi SR, Reed GR, Willey C, Prochaska J0.   Stages of change for reducing dietary fat to 30% of energy or less. J. Amer. Diet. Assn 94:1105-1110, 1994.
11. Curry SJ, Kristal AR, Bowen DJ An application of the stage model of behavior change to dietary fat reduction. *Health Education Research: Theory & Practice*, 7, 95-105, 1992.
12. Rossi SR. Application of the Transtheoretical Model of Behavior Change to dietary fat reduction in a naturalistic environment. Unpublished doctoral dissertation, University of Rhode Island, 1993
13. Rossi SR, Rossi JS, Prochaska J0, Velicer WF. Measurement structure of a decisional balance Questionnaire for dietary fat reduction. Paper presented   at the 101st Annual Convention of the American Psychological Association, Toronto, Ontario, Canada.
14. Rossi SR, Greene GW, Reed G, Prochaska JO, Velicer WF, Rossi JS. A comparison of four stage of change algorithms for dietary fat reduction. Annals of Behavioral Medicine, 15 (supplement), 63, 1993.
15. Rossi SR, Rossi JS. Concepts and theoretical models applicable to risk reduction. In N. Jairath (Ed.), Coronary Heart Disease & Risk Factor Management: A Nursing Perspective. W.B. Saunders (in press).
16. Prochaska J0, DiClemente, CC, Velicer WF, Rossi JS Standardized individualized, interactive, and personalized self-help programs for smoking cessation. Health Psychology, 12, 399-405, 1993.
17. Rossi SR (1993.) Dietary fat reduction behavior profiles across five categories of high fat food sources for five stages of change. Annals of Behavioral Medicine, 15 (supplement), 63 (Abstract).

TABLES AND FIGURES

Table 1

Age and Education Distribution at Baseline: Control Vs. Experimental Group

Variables	Control			Experimental		
	Mean	SD	N	Mean	SD	N
Age	40.9	13.5	41	40.7	11.3	37
Education	15.5	2.1	41	15.9	3.2	37

Table 2

Daily Dietary Intake of Fat as a Percent of Total
Calories and Fiber Intake in Grams

Variables	Control (n = 35)			Experimental (n = 31)		
	Baseline Mean (SD)	Final Mean (SD)	P-Level	Baseline Mean (SD)	Final Mean (SD)	P-Level
Fat as % of Calories	36.6 (5.3)	36.5 (5.9)	0.93	38.7 (5.8)	36.4 (4.9)	0.04
Fiber Intake in Grams	11.7 (3.4)	12.2 (3.7)	0.37	11.2 (3.0)	13.0 (3.9)	0.01

Table 3

Biochemical Indicators: Control Vs. Experimental From Baseline to Final

Variables	Control (n = 34)			Experimental (n = 30)		
	Baseline Mean (SD)	Final Mean (SD)	P-Level	Baseline Mean (SD)	Final Mean (SD)	P-Level
High Density Lipoprotein (HDL)	58.6 (18.4)	61.2 (18.8)	0.07	53.5 (14.8)	57. (12.4)	0.04
Low Density Lipoprotein (LDL)	124.1 (26.5)	120.3 (26.8)	0.2	117.1 (39.5)	116.8 (43.8)	0.9
Total Cholesterol	201.8 (33.6)	203.2 (36.8)	0.69	191.5 (40.6)	196.2 (45.1)	0.22
Triglyceride	95.5 (46.3)	105.5 (50.9)	0.12	104.5 (33.9)	112.7 (42.5)	0.18
Estradiol	71.5 (66.8)	-----	--	75.8 (69.3)	--	--
Breath Fiber	2.07 (1.9)	1.4 (1.4)	0.32	4.5 (10.3)	1.7 (1.2)	0.39

Table 4

Stage of Change Level: Control Vs. Experimental
From Baseline to Final

| Variables | Control (n = 35) | | | Experimental (n = 31) | | |
	Baseline Mean (SD)	Final Mean (SD)	P-Level	Baseline Mean (SD)	Final Mean (SD)	P-Level
Stage of change	2.8 (1.3)	3.1 (1.2)	0.05	2.8 (1.1)	3.2 (0.8)	0.01
Improved At Least One Stage	-----	28%	0.05	--	32%	0.05

Table 5
Initial Respondent Distribution
Stage of Change Using Algorithm I (Belief & Intention Criterion Alone)

Stage	N	%	
Precontemplation	5	8.2	
Contemplation	8	13.1	
Preparation	8	12.1	
Action	19	31.1	
Maintenance	21	34.1	
Totals	61	100.00	

Table 6
Initial Respondent Distribution
Stage of Change Using Algorithm 2 (30% Criterion)

Stage	N	%	
Precontemplation	8	13.1	
Contemplation	18	29.5	
Preparation	15	24.6	
Action	15	24.6	
Maintenance	5	8.2	
Totals	61	100.00	

Table 7
Initial Respondent Distribution
Stage of Change Using Algorithm 2 (25% Criterion)

Stage	N	%	
Precontemplation	8	13.1	
Contemplation	19	31.1	
Preparation	15	24.6	
Action	19	31.1	
Totals	61	100.00	

Table 8
Pre-Action Control and Experimental Subjects
Stage of Change Using Algorithm I (Belief & Intention Criterion Alone)

Stage	N	%
Precontemplation	5	12.2
Contemplation	8	19.5
Preparation	8	19.5
Action	14	34.1
Maintenance	6	14.6
Totals	41	100.00

Table 9
Stage of Change Pre-Action Control and Experimental Subjects
Using Algorithm 2 (30% Criterion)

Stage	N	%
Precontemplation	8	19.5
Contemplation	18	43.9
Preparation	15	36.6
Totals	41	100.00

Table 10
Stage of Change Pre-Action Control and Experimental Subjects
Using Algorithm 2 (25 % Criterion)

Stage	N	%
Precontemplation	8	19.5
Contemplation	18	43.9
Preparation	15	36.6
Totals	41	100.00

Table 11
Pre-Action Control Subjects
Stage of Change Using Algorithm 1 (Belief & Intention Criterion Alone)

Stage	N	%
Precontemplation	4	18.2
Contemplation	4	18.2
Preparation	3	13.6
Action	8	36.4
Maintenance	3	13.6
Totals	22	100.00

Table 12
Pre-Action Control Subjects
Stage of Change Using Algorithm 2 (30% Criterion)

Stage	N	%
Precontemplation	5	22.7
Contemplation	11	50.0
Preparation	6	27.3
Totals	22	100.00

Table 13
Pre-Action Experimental Subjects
Stage of Change Using Algorithm 1 (Belief & Intention Criterion Alone)

Stage	N	%
Precontemplation	1	5.3
Contemplation	4	21.1
Preparation	5	26.3
Action	6	31.6
Maintenance	3	15.8
Totals	19	100.00

Table 14
Pre-Action Experimental Subjects
Stage of Change Using Algorithm 2 (30% Criterion)

Stage	N	%
Precontemplation	3	15.8
Contemplation	7	36.8
Preparation	9	47.4
Totals	19	100.00

Table 15
Stage of Change at Outcome for Controls
Using Algorithm 2 (30% Criterion)

Stage	N	%
Precontemplation	1	4.5
Contemplation	8	36.4
Preparation	7	31.8
Action	5	22.7
Maintenance	1	4.5
Totals	19	100.00

Table 16
Stage of Change at Outcome for Experimental Subjects
Using Algorithm 2 (30% Criterion)

Stage	N	%
Precontemplation	3	15.8
Contemplation	5	26.3
Preparation	5	26.3
Action	6	31.6
Totals	19	100.00

Table 17
Comparison of Effect Sizes (Cohen's d)
Between Experimental and Control Groups at Outcome

TTM Construct	Experimental	Control
Decisional Balance		
Pros	.477	-.084
Cons	.044	-.108
Overall Temptation	.011	-.261
Overall Self-Efficacy	.321	.112
Processes		
Consciousness Raising	.486	.266
Dramatic Relief	.037	.375
Self Reevaluation	1.084	.032
Self Liberation	.484	.418
Environmental Reevaluation	1.083	.504
Social Liberation	.043	.432
Helping Relationships	.184	.916
Reinforcement Management	.225	.474
Interpersonal Relationships	.679	-.265
Counterconditioning	.591	.068
Stimulus Control	.408	.273

Effect sizes are expressed as Cohen's d (9)

(.2) small effect
(.5) medium effect
(.8) large effect

Table 18

TTM Scales Means and Standard Deviations for Baseline and Outcome for Control Group

TTM Scale	Controls (n = 22) Baseline		Outcome		Experimental (n = 19) Baseline		Outcome	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pros	4.37	0.727	4.31	0.705	3.82	0.885	4.18	0.623
Cons	2.51	0.980	2.41	0.864	2.34	0.855	2.30	0.949
Temp	2.84	0.668	2.67	0.635	2.71	0.981	2.72	0.852
Conf	3.07	0.476	3.13	0.593	3.00	0.744	3.23	0.753
CR	2.95	1.282	3.23	0.825	3.28	0.803	3.67	0.801
DR	2.24	1.040	2.62	0.988	2.47	1.008	2.51	1.183
SR	3.61	1.144	3.64	0.727	3.44	0.619	3.96	0.414
SL	3.08	1.313	3.56	0.985	3.42	0.807	3.79	0.722
ER	2.79	1.259	3,38	1.080	2.84	1.044	3.75	0.637
SO	3.14	0.852	3.53	0.952	3.38	0.631	3.35	0.758
HR	2.14	0.973	2.97	0.838	2.74	1.057	2.92	0.899
RM	1.83	0.705	2.23	0.982	2.16	0.996	2.37	0.867
IP	2.35	0.969	2.09	1.040	1.81	0.688	2.37	0.962
CC	2.35	1.052	2.42	1.081	2.18	0.989	2.77	1.006
SC	2.30	0.964	2.55	0.842	2.61	0.659	2.89	0.712

SD = Standard Deviation
PC = Precontemplation
C = Contemplation
P = Preparation
A = Action
M = Maintenance

CR = Consciousness Raising
DR = Dramatic Relief
SR = Self Reevaluation
SL = Self Liberation
ER = Environmental Reevaluation
HR = Helping Relationships
RM = Reinforcement Management
IP = Interpersonal Systems Control
CC = Counterconditioning
SC = Stimulus Control

FIGURE 1

Meharry Demonstration Project
% Fat Consumption
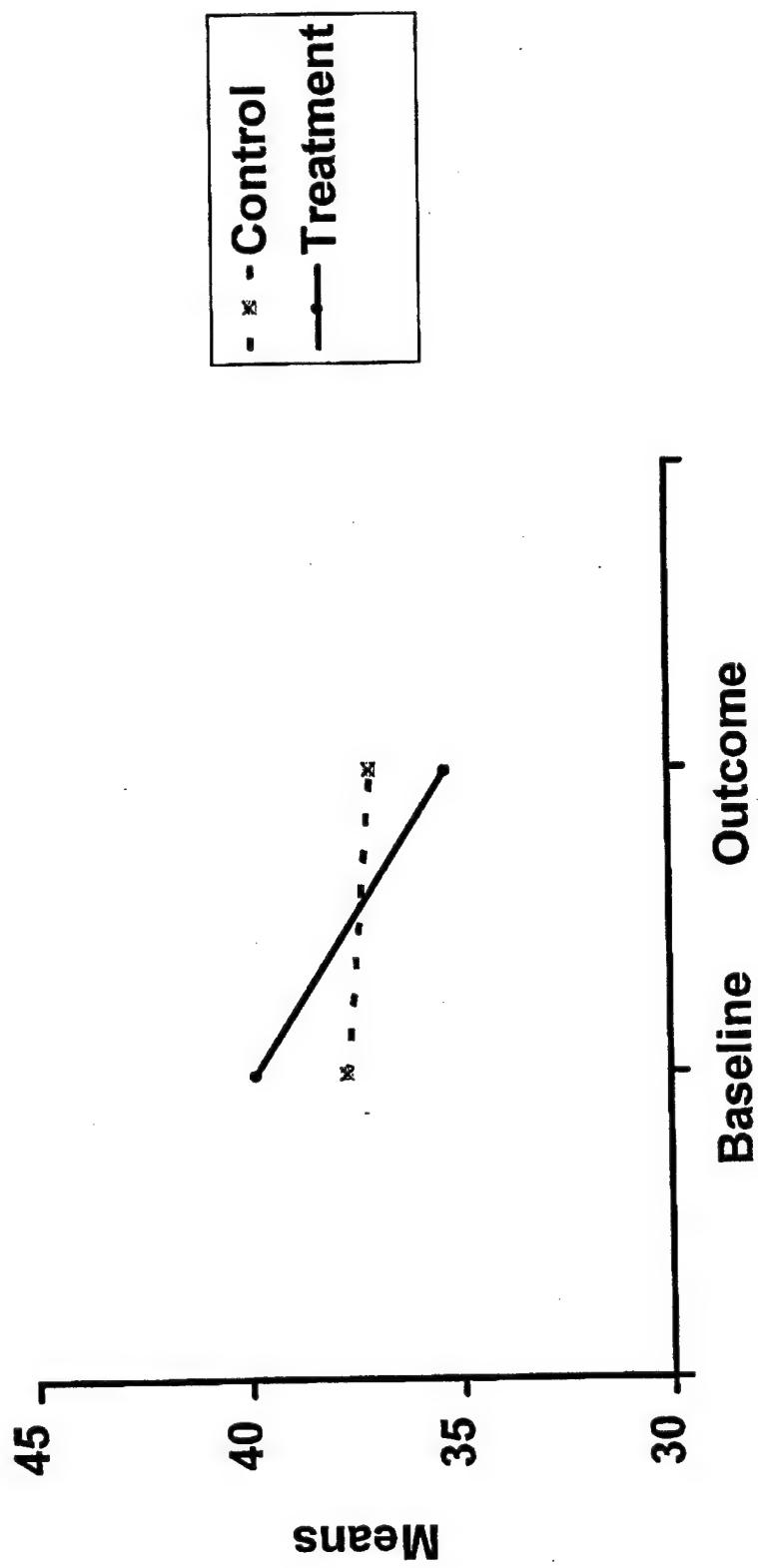
CONCLUSIONS

Conclusions

The data presented in this Report indicate that:

(1) a culturally-sensitive Transtheoretical Model-based questionnaire could be developed for African American women, incorporating constructs of Stage, Decisional Balance, Self-efficacy, Situational Temptation, and Processes of Change (Consciousness Raising, Dramatic Relief, Self-Reevaluation, Social Liberation, Environmental Reevaluation, Helping Relationships, Reinforcement Management, Interpersonal Systems Control, Counterconditioning, and Stimulus Control). All instruments could be shortened, except for the Confidence scale, which requires further confirmatory testing;

(2) a pilot intervention program based on transtheoretical model principles (experimental group) resulted in trends towards improvements in specific outcome and process measures as compared with an intervention based on health information dissemination (control group).

      (a) The experimental group showed improvements in more variables than the control group (fat as a percent of energy, fiber intake in grams, stage of change level, serum HDL; food group selection such as having five or more fruits and vegetables each day, adopting low fat chicken preparation methods, trimming fat from meats, avoiding butter, margarine, high fat dressings, and high fat breads; and using constructs of change such as pros, self-efficacy, and processes such as consciousness raising, self liberation, counterconditioning, stimulus control, self reevaluation, environmental reevaluation, and interpersonal systems control).

      (b) The control group showed improvements in some variables (stage of change level, serum HDL; food group selection such as choosing low fat or fat-free snacks, avoiding butter, margarine, gravy, mayonnaise, and salad dressings made with oils; and using processes of changes such as self liberation, dramatic relief, social liberation, reinforcement management, and helping relationships.

Given the short-term intervention, the small sample size, and the recruitment difficulties, these are encouraging findings. However, it should be noted that dietary fat and fiber did not reach recommended standards, but did improve by 9 and 22 percent respectively in the experimental group. There is now a need to move to the next stage of experimentation, a Clinical Trial, which will test a longer intervention in a large sample, using a randomized study design. We believe that the sequential accrual of small groups of subjects for the intervention will decrease difficulties of recruitment experienced for the current study design.

Recommendations

For a more effective study, we make the following recommendations:

(a) have a longer period of intervention from twelve to eighteen months. It has been determined that movement through each stage may take an average of six months. The longer period would allow movement through at least two stages.

(b) make more use of the ESQ to personalize the individual's changes in eating required to achieve the goal of <25% of fat as calories, and 25 grams of fiber;

(c) involve the subjects in more tasting, food preparation, and sharing sessions;

(d) engage in individual counseling around the transtheoretical model constructs. Counselors will need to demonstrate an understanding of and facility with the model's concepts; and

(e) increase subject participation fees.

Reasons for not completing the Projected Statement of Work.

This was an ambitious and complex study. We had requested a four-year grant, but the amount approved was cut by 25 percent. We therefore modified our request to cover three years. On the other hand, it took more time than expected to develop a culturally sensitive TTM-based questionnaire and intervention program, and to engage in subject recruitment. We had been advised by our Consultants, Al Marcus and Joe Rossi, that, for this study, we should concentrate on program development alone, ending with a pilot demonstration program. This would allow us to request a more substantial grant to complete a well-designed study. We have, in fact, done this. We have requested funding to conduct a large scale Clinical Trial. These study results will allow us to improve on the study design of the clinical trial.

APPENDICES

List of Appendices

Appendix A:
Abbreviations

PC - Precontemplation or Precontemplator

C - Contemplation or Contemplator

P - Preparation or Preparer

A - Action or Act-er

M - Maintenance or Maintainer

TTM - Transtheoretical Model

NCI - National Cancer Institute

ACS - American Cancer Society

ESQ - Eating Styles Questionnaire

Appendix B

1. TTM-based Questionnaire (Part 4)

2. ESQ (with Eating Styles Questionnaire) (Part 5)

Interviewer:_____ Date Completed: _____ Code No.:_____

DOD - Questionnaire 2

Part 1: PERSONAL INFORMATION (CONFIDENTIAL)

01. Name: (Ms., Mrs.) _____

02. Home Address: _____

03. City: _____ State: _____ Zip Code: _____

04. Telephone No. (Home): (   ) _____ (Work): (   ) _____

05. Employer: (if applicable) _____

06. Address: _____

07. City: _____ State: _____ Zip Code: _____

08. Job Title: _____

09. Department: _____

10. Date of birth: Month _____ Day _____ Year _____
    Age (last birthday): _____

11a. Highest grade level achieved (Circle # of years of education):
    1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

11b. Degree held?-Bachelors, Masters, Doctorate: _____

11c. Other certificates held ? Y   N   Type of certificate: _____

12. Marital Status: Single _____, Married _____, Divorced _____, Widowed _____,
    Other (describe) _____

13. Race: Black____ White____ Hispanic____ American Indian____ Asian____ Other_____

14. Church Attended & Location: _____

15. Sorority (if applicable): _____

16. Times available (to reach you if necessary):

	Mornings	Afternoons	Evenings
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

DODQ2.WP1 Dec '96

Since your name does not appear anywhere on the following questionnaires, please be sure you answer all questions.

Please complete promptly and return to the site coordinator.

All answers are kept confidential.

If you have any questions, please do not hesitate to ask.

We appreciate your participation in this important project?

Thank You !

A project of:

<div style="border:1px solid">

Meharry Medical College
Community Coalition for Minority Health
1005 D.B. Todd Blvd, Box 99a
Nashville, TN 37208
(615) 327-5728/5729

</div>

Interviewer: _____   Code No.: _____

Place of interview: _____   Date: _____   98

Part 2: QUICK DIETARY SCREEN (DIETARY HABITS)

Please circle below Yes (Y) or No (N) for the foods you usually eat at least <u>5 times a week</u>.

YES	NO	FOOD
Y	N	Breakfast cereal.
Y	N	**Oranges, grapefruit, (fruit, not juice)**
Y	N	Eggs
Y	N	**Non-fat skim milk, butter milk or 1% milk (nut soy or nut milk)**
Y	N	Lowfat cottage cheese or other lowfat diet cheese
Y	N	**Any cheese or cream cheese except lowfat diet cheeses (include snacks and casseroles)**
Y	N	Dark breads (whole wheat, rye, pumpernickel)
Y	N	**Rice, spaghetti, or corn tortillas**
Y	N	Margarine on breads, vegetables, corn, potatoes, etc.
Y	N	**Butter on breads, vegetables, corn, potatoes, etc.**
Y	N	Lard in cooking
Y	N	**Green salad**
Y	N	Salad dressings or mayonnaise (exclude low calorie diet type)
Y	N	**Red meat (beef, ham, pork, or lamb)**
Y	N	A vegetable at lunch
Y	N	**A vegetable at dinner**
Y	N	Two or more servings of vegetables (exclude lettuce)
Y	N	**Two or more fruits**
Y	N	Nuts or peanut butter
Y	N	**Cookies**

Circle (Y) yes or (N) no for the foods you usually eat at least <u>once a week</u>.

Y	N	Squash (acorn, zucchini, etc.)
Y	N	**Broccoli, cauliflower, brussel sprouts, or cabbage**
Y	N	Peas or green beans
Y	N	**Cooked dried beans (baked, chili, kidney, refried, black, navy, etc.)**
Y	N	Brown rice
Y	N	**Tofu or bean curd**
Y	N	Bananas
Y	N	**Raisins, prunes, or other dried fruit**
Y	N	Melon (cantaloupe, water melon, etc.)
Y	N	**Hot dogs**
Y	N	Hamburger
Y	N	**Chicken with skin on**
Y	N	Bacon
Y	N	**Processed or lunch meat (bologna, sausage, etc.)**
Y	N	Tuna fish
Y	N	**Fried fish**
Y	N	All other fish
Y	N	**Grains, pasta or beans for main meal (no meat, eggs, or cheese)**
Y	N	Cream or whipped cream
Y	N	**Ice cream**
Y	N	Sour cream
Y	N	**Yogurt**
Y	N	Low calorie (diet) mayonnaise or salad dressing
Y	N	**Low calorie (diet) margarine**
Y	N	Potato chips, corn chips, etc.
Y	N	**Food fried in restaurant (french fries, chicken, etc.)**
Y	N	Food fried at home
Y	N	**Pastries (donuts, danish, sweet rolls, croissants, etc.)**
Y	N	Pies, cakes, or cookies

DODQ2.WP1 Dec '96   Code No. _____

Y   N   **Meal in fast food restaurant**

1. **About how many times a week do you eat red meat? (beef, pork, ham, lamb) for dinner or your main meal?**

    0   1   2   3   4   5   6   7 (times/week)

2. **When you prepare or eat meat, do you trim the fat?**
    A) Trim all or most of the fat   B) Trim some fat   C) Do not trim fat

3. **Which of the following best describes how you spread butter or margarine on bread, etc.**
    A) None   B) Just a scrape   C) Light coating   D) Medium coating   E) Thick coating

PART 3: STAGES OF CHANGE

1. **Do you <u>CONSISTENTLY</u> avoid eating high fat foods?**

    1. NO, and I do <u>NOT</u> intend to in the <u>next 6 months.</u>
    2. NO, but I intend to in the <u>next 6 months.</u>
    3. NO, but I intend to in the <u>next 30 days.</u>
    4. YES, and I have been, but for <u>LESS than 6 months.</u>
    5. YES, and I have been for <u>MORE than 6 months.</u>

I need to have your *honest opinion* about changing your fat intake. The following choices are what it takes to get your fat down to the recommended level.

1. **ALMOST ALWAYS** avoid red meat (e.g. *ham, bacon, beef, pork, hotdogs*)
2. **ALWAYS** use low fat or fat free dairy products (e.g. *skim milk, low fat cheese, low fat yogurt*).
3. **ALMOST ALWAYS** avoid eating fast foods (e.g. *hamburgers, french fries, fried chicken, pizza, and sausage biscuits*).
4. **ALMOST NEVER** snack on high fat foods (e.g. *donuts, cake, fried pies, chips, peanuts, ice cream, candy bars*).
5. **OFTEN** buy the low calorie or low fat version of a product (e.g. *lite salad dressing, low fat mayonnaise, reduced fat margarine, reduced fat frozen dinners, fat free crackers, frozen yogurt*).

---

2. **Are you willing to do ALL 5 of these things to get your fat down to the recommended level?**
    1. NO, and I do <u>NOT</u> intend to in the <u>next 6 months.</u>
    2. YES, and I intend to in the <u>next 6 months.</u>
    3. YES, and I intend to in the <u>next 30 days.</u>
    4. YES, and I am already doing all five.

GO TO PROS & CONS SECTION (Part 4)

DODQ2.WP1 Dec '96   Code No. _____

PROS & CONS

People have many different reasons for eating the way they do. Whether or not you decide to cut down on fat depends on how <u>important</u> the pros (benefits) and cons (hassles) of cutting down on fat are to you. How important are each of the following pros and cons to you in making a decision about changing your eating habits?

How important is it to me that . . . ?

1. High fat foods taste better.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

2. I would be healthier if I ate less fat.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

3. Lower fat foods just don't have the flavor I'm used to.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

4. I'd have fewer health risks if I ate lower fat foods.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

5. Cutting down on fat involves giving up family traditions.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

Code No. _____

6. I might live longer if I adopted lower fat eating habits.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

7. Eating lower fat foods would be too stressful right now.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

8. Eating lower fat foods would help me control my weight.

1. Not Important
2. Slightly Important
3. Moderately Important
4. Very Important
5. Extremely Important

GO TO TEMPTATION SECTION

Code No. _____

TEMPTATION

We've all been in situations where it's tempting to eat a high fat food we really like. The following are different situations that people sometimes find tempting. How **TEMPTED** would you be to eat a high fat food in each situation?

How TEMPTED would you be to eat a high fat food(s) in each situation . . . ?

1. While eating out at a restaurant with close friends.

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

2. When I have had an argument with someone close to me and feel upset.

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

3. When it is a problem to substitute a low fat food for the high fat one I really want to eat.

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

4. While having a good time with friends at a party.

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

5. During those times when I feel myself depressed about something.

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

DODQ2.WP1 Dec '96

Code No. _____

**6. In situations in which eating a low fat food is just
too much trouble.**

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

**7. While enjoying the company of others at a picnic
or barbecue.**

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

**8. On days when things are not going my way and I
feel frustrated.**

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

**9. When it would be very difficult to substitute a low fat
food because only high fat ones are available.**

1. Not At All Tempted
2. Not Very Tempted
3. Moderately Tempted
4. Very Tempted
5. Extremely Tempted

GO TO STRATEGIES SECTION

Code No. _____

Dietary Fat: Strategies

These questions are about your thoughts, feelings, and experiences over the last month. They can affect your eating habits. For each question, think back over the last month. HOW OFTEN did you think, feel or do each one?

During the past month, how often have you done the following . . . ?

1. **I had someone who listened when I needed to talk about changing what I eat.**

   1. Never
   2. Seldom
   3. Occasionally
   4. Often
   5. Repeatedly

2. **I expected to be praised by others if I cut down on the amount of fat I ate.**

   1. Never
   2. Seldom
   3. Occasionally
   4. Often
   5. Repeatedly

3. **I avoided eating with other people who might encourage me to eat high fat foods.**

   1. Never
   2. Seldom
   3. Occasionally
   4. Often
   5. Repeatedly

4. **I kept myself busy to avoid eating a favorite high fat food.**

   1. Never
   2. Seldom
   3. Occasionally
   4. Often
   5. Repeatedly

5. **I didn't bring tempting high fat foods into my house.**

   1. Never
   2. Seldom
   3. Occasionally
   4. Often
   5. Repeatedly

Code No. _____

6. I considered information I read, saw, or heard on lowering dietary fat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

7. I became upset by warning signs about the hazards of eating too much fat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

8. I made commitments to reduce the amount of fat in my diet.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

9. I felt good about myself when I cut down the amount of fat in my diet.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

10. I thought that society would be healthier if more people reduced the amount of fat they ate.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

11. I noticed it's easier to find low fat foods in stores now.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

Code No. _____

12. I had someone I could count on when I was having a problem with cutting down on fat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

13. I thought other people would be pleased if I reduced the amount of fat I eat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

14. I gave up eating with people who mainly eat foods high in fat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

15. I tried to distract myself by doing something else when I was likely to eat food high in fat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

16. I removed tempting high fat foods from my home.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

17. I thought about information on how to limit the amount of fat I eat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

Code No. _____

18. **I got upset when I remembered research about illnesses associated with eating too much fat.**

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

19. I made commitments not to eat high fat foods.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

20. I felt better about myself when I knew I was eating a low fat dinner.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

21. I thought that our country's health care costs would be lower if people ate less fat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

22. I found society changing in ways that made it easier to reduce the amount of fat in my diet.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

23. I had someone I could rely on to support my decision to develop healthier eating practices.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

Code No. _____

24. Others tried to make me feel good when I didn't eat high fat foods.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

25. I avoided social situations that might tempt me to eat too many high fat foods.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

26. I found it helpful to engage in some physical activity to keep from eating a favorite high fat food.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

27. I gave away leftover high fat desserts so I wouldn't eat them.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

28. I looked for information on how to reduce the amount of fat in my diet.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

29. I got upset when I saw TV programs about people who had diseases related to eating a diet high in fat.

1. Never
2. Seldom
3. Occasionally
4. Often
5. Repeatedly

Code No. _____

30. I told myself I can choose to eat a diet low in fat.

        1. Never
        2. Seldom
        3. Occasionally
        4. Often
        5. Repeatedly

31. I thought that keeping myself healthy involved changing what I eat.

        1. Never
        2. Seldom
        3. Occasionally
        4. Often
        5. Repeatedly

32. I thought the world would be a better place if more people cut down on fat.

        1. Never
        2. Seldom
        3. Occasionally
        4. Often
        5. Repeatedly

33. I found that more and more people were cutting down on fat.

        1. Never
        2. Seldom
        3. Occasionally
        4. Often
        5. Repeatedly

GO TO CONFIDENCE SECTION

CONFIDENCE

The amount of CONFIDENCE people feel about being able to resist eating a favorite high fat food often varies depending upon their situation. How CONFIDENT do you feel about being able to resist eating a favorite high fat foods in each of these situations?

How CONFIDENT are you that you could resist eating high fat food(s) in each situation . . . ?

1. While having a good time at a party.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

2. When I have had a hard day and am not feeling good about myself.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

3. When only high fat foods are available.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

4. When I am celebrating with friends and feel happy.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

Code No. _____

5. When I feel depressed about something.

1. Not At All Confident
2. Not Very Likely
3. Moderately Likely
4. Very Likely
5. Extremely Likely

6. When eating a low fat food is just too much trouble.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

7. While eating out at a restaurant with close friends.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

8. On days when things are not going my way and I feel frustrated.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

9. When substituting a low fat food for the high fat one I really want is a problem.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

10. While enjoying the company of others at a picnic or barbecue.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

Code No. _____

11. When I have an argument with someone close to me and feel upset.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

12. When others around me are eating high fat foods.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

13. When I am craving a high fat food.

1. Not At All Confident
2. Not Very Confident
3. Moderately Confident
4. Very Confident
5. Extremely Confident

Code No. _____

The following questions have to do with eating styles. For each question, decide whether the statement describes your eating style. Please answer each question <u>as honestly as possible</u>. Answer by circling the choice that best describes <u>how often</u> each statement applies to you.

1. I <u>**avoid**</u> eating hamburgers, fried chicken, french fries, and other high-fat foods at fast food restaurants.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

2. When I eat at a restaurant, I <u>**look for**</u> low-fat foods to order.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

3. I <u>**choose**</u> snack foods that are low in fat or fat free.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

4. When I want to eat meat, I <u>**choose**</u> baked, broiled, or boiled chicken without the skin instead of red meat.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

5. I <u>**avoid**</u> eating red meat (beef, ham, liver, or pork).

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

6. When I eat red meat (beef, hamburgers, ham, hot dogs, or pork) I <u>**choose**</u> very lean cuts or trim off the fat.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

7. When I eat lunch meats, (bologna, sliced ham, sliced turkey, salami), I <u>**choose**</u> cuts that are low in fat or fat free.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

8. I <u>**avoid**</u> using butter, margarine, gravy, regular mayonnaise, and salad dressings made with oil.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

Code No. _____

9. I **eat** five or more servings of fruits and vegetables **every day**.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

10. When I have a choice between a regular product and one that is low-fat or fat free, I **choose** the low-fat or fat free product.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

11. When I buy dairy products (milk, yogurt, cheese, ice-cream), I **buy** items that are low-fat   or fat free.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

12. I **eat** a serving of bread, rolls, bagels, rice, pasta, grits, oatmeal, or cereal at **every meal**.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

13. I **eat** a salad **every day**.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

14. When I eat greens and other vegetables, I **never use** fatback, butter, or other fats.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

15. When I eat grits, I **avoid** adding butter or margarine.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

16. I **avoid** eating nut-breads, biscuits, or croissants, and **choose** breads that are low in fat or fat free instead.

Never	Rarely	Sometimes	Usually	Always
1	2	3	4	5

Code No. _____

Part 7: Income Assessment

We understand that this is very private information, and it will be kept <u>very confidential</u>. Please note that your name does not appear anywhere on this page. The page will be detached and kept separate. This information is very important for our analyses. Please make sure that you circle the range which represents <u>all</u> sources of income: salaries, wages, tips, commissions, & investments. We appreciate your assistance with this. Thank you.

Income range:
(Circle one)

<$5,000

5,001 - 10,000

10,001 - 15,000

15,001 - 20,000

20,001 - 30,000

30,001 - 40,000

40,001 - 50,000

50,001 - 75,000

>75,000

Code No. _____

Appendix C

TTM-based Principles for
Developing the
Intervention

1. Principles for Each Stage of change
2. Summary Chart of Focus Group Recommendations
3. Focus Group Responses to Dietary Intervention Materials
4. Guidelines for Each Stage of Change - Color Handouts
5. Dietary Intervention Principles for Each Stage of Change

Table 1.
Transtheoretical Model-based Principles of Behavior Change for Each Stage of Change

	PC	C	P	A	M
Stages of Change	Pre-contemplator	Contemplator	Preparer	Actor	Maintainer
Stage characteristics	Unwillingness to change In denial of problem Low confidence High temptation to continue behavior	Ambivalent. Thinking about change. Aware should change but doesn't want to Decisional balance Equal pros and cons	Has a vague plan for change. Committed to change. Engages in experiments. Benefits outweigh costs	Implements plan to change Relapses and fluctuates, but plan generally works Difficulty managing change	Relapse less likely Client remains vigilant Low temptation to continue old behavior High confidence in the ability to change
Clients Tasks	Recognizes problem as a major health hazard	Turns thought into behavior and makes decision to change	Tries different strategies and learns from personal mistakes	Hangs with strategies for benefits Manages relapse	Sustains change as life-long habit Resists pull of stress into old habits
Facilitating Change	Focus on: Recruitment, Resistance, Retention	Actively engage in generating pros and cons. Provide info. on the benefits of change	Provide change models Provide detailed plan with doable, small steps	Change strategies for benefits Manage Relapses	Prevent relapse when risk is perceived Help recover from relapse and recycle quickly
T T M Processes	Consciousness Raising Dramatic Relief Self-Reevaluation Environmental Reevaluation	Consciousness Raising Self-Reevaluation Self Liberation Social Liberation Helping Relationships	Consciousness Raising Self-Reevaluation Self Liberation Social Liberation Helping Relationships Counter-conditioning Stimulus Control	Consciousness Raising Environmental Reevaluation Helping Relationships Counter-conditioning Stimulus Control Reinforcement Management Interpersonal Systems Control	Consciousness Raising Environmental Reevaluation Helping Relationships Counter-conditioning Stimulus Control Reinforcement Management Interpersonal Systems Control

Table 2. Summary Chart of Focus Group Recommendations

TTM Stage	Interaction	Receptivity	Interests	Contact	Contact
Precontemplators	Heavy	Extremely open to change	Substitutions; End result; goal ;taste; reminder info	Meetings; mailings; tele calls	Quarterly mtgs & mailings; monthly update tele calls
Contemplators	Moderate	Info well received	Health, share dishes; taste	Meetings; mailings; tele calls	Quarterly mtgs; routine tele call motivator
Preparers	Interactive	Info well received	Recipes; taste	Meetings; mailings; tele calls	Biweekly mtgs; monthly mailings & tele progress calls
Acters	Very Interactive	Delighted	Convenience; share recipes; taste; gain more info.	Meetings; mailings; tele calls	Monthly 1-hour mtgs; mailings on DI schedule; tele calls freq-quarterly
Maintainers	Extremely interactive	High	Recipes; Role models; health; good food; food preparation; substitutions	Meetings; mailings	Bimonthly mtgs; mailings on DI schedule

Table 3. Focus Group Responses to Dietary Intervention Materials

TTM Stage	Eat Food with Fiber Every Meal Poster	Eat Your Way to Good Health Poster	Eat Less Fat flyer/mailer	Down Home Healthy flyer	Eat more Fruits & Vegs - 5 A Day for Better Health	Action Guide to Healthy Eating	What's New About the New Food Label	Additional Information		Summary
Pre-contemplators	Good for menu examples; bkfst NOT appealing	Appropriate	Appropriate	Appropriate; sub list very popular	NA	NA	Not recommended; more receptive to basic fiber info	End result & case of action effective for change	Group committed to change	Respond to increased info
Contemplators	Appropriate	Appropriate	Appropriate	Appropriate	NA	NA	Not as appropriate as other brochures	Group voluntarily committed to change		Info produced change commitment; knowing small steps impt.
Preparers	Not attractive	Appealing meal, models & expressions	Appropriate	Valued recipes	Use for review	NA	Appealing, but more interested in foods that contain fiber	Committed to mail flyer immediately	making habits permanent	Respond to info
Actors	Positive resp; good demo with high fiber, everyone can identify with people in pic	Positive resp: good food portion examples; plates not overloaded	Appropriate: shows current activities of this stage	Positive resp: substitution list highly valued	Positive resp: affirmed new eating habits, nutrition chart helpful	Positive resp: answers questions about fat	Appropriate	Aware of supports in environ men	All plan to mail cookbook coupon same day as session	Taking action now; seeking more & related info
Maintainers	Recommended but not very appealing	Striking; recommended	Recommended	Recommended striking; very popular piece	Recommended	Recommended				

NA=Not Administered

Precontemplators

Change Your Diet
Change Your Life

...One step at a time

Meharry Cancer Control Unit

Not Ready to Change
Eating high fat foods

Think about changing

- What are your barriers to change?
- Think about the benefits of change
- Look at your eating habits
- Be open to learning about better eating

Contemplators

Thinking About Changing
Eating high fat foods

Make a decision to change

- Focus on the reasons to change
- Low fat eating is easier than you think
- Increase your awareness
- Change your self-image
- Try eating more fruits and vegetables

Preparers

Ready to Change
Eating low fat foods soon

Prepare to eat low fat foods

- Make a promise to change
- Take small steps
- Get help from others
- Try different strategies
- Find out what works for you

Act-ers

Recently Made a Change
Now eating low fat foods

Taking action to change

- Take control of your eating habits
- Substitute healthy food
- Reward yourself
- See slips as a learning experience
- Use low fat cooking methods
- Avoid temptations

Maintainers

Maintaining the Change
Low fat eating has become a healthy habit

Sticking with low fat eating

- Stay in control of your eating habits
- Keep substituting low fat foods
- Eat a more balanced diet
- Deal with stress
- Manage setbacks
- Try new recipes

Dietary Intervention Principles
for
Each Stage of Change

V.   Dietary Intervention for Precontemplators (PCs)
TTM Stages for PCs:
Consciousness Raising (CR)
Dramatic Relief (DR)
Self-Reevaluation (SR)
Environmental Reevaluation (ER)

Processes with PCs:

ADDRESSING THE STAGE CHARACTERISTICS
ADDRESSING WHAT WE KNOW ABOUT THE STAGE OF CHANGE
> Not ready/cannot/unwilling to change
> Lack awareness of problem
> In denial about problem
> Costs more important than benefits
>> Engage in dialog about reasons for unreadiness
>> Present "role models", examples of strategies
>> Present current stats about cancer, breast cancer, diet, and
>>> African Americans
> Tried and failed
> Demoralized
> High temptation to continue behavior
> Low confidence in ability to change
>> Engage in dialog about experiences
>> Present new and fresh info and ideas about issue
>> Indicate supports available
>> Present "role models", examples of strategies

CLIENT TASKS IN THIS STAGE OF CHANGE
> Think about the problem
> Recognize problem as major health problem
> Personalize the problem
>> Engage in dialog about personal experiences
>> Provide stats and role model info
>> Provide info re long-term consequences of behavior

GUIDELINES TO FACILITATE CHANGE: Be non-judgemental!!
> Recruitment
>> Indicate interest in those not involved
>> Increase awareness of the problem
>>> give info and feedback
> Resistance
>> Provide list of pros and cons to change
>> Deal with denial and defensiveness
>>> be tough without preaching
> Retention: Use innovative, exciting interventions

Pcs cont'd

TTM PROCESSES FOR PCs:
Consciousness Raising:
> provide info:
>> Spread the Word about Cancer: Guide...

Dramatic Relief:
> create emotional motivator
>> survivor statement (DAI clip)

Self-Reevaluation:
> encourage reappraisal, reassessment

Environmental Reevaluation:
> emphasize impact on others (influence on kids)
>> inquire about/discuss Ss role in family meals

VI. Dietary Intervention for Contemplators (Cs)
TTM Stages for Cs:
Consciousness Raising (CR)
Self-Reevaluation (SR)
Self-Liberation (SeL)
Social Liberation (SoL)
Helping Relationships (HR)

Processes with Cs:
ADDRESSING THE STAGE CHARACTERISTICS
ADDRESSING WHAT WE KNOW ABOUT THE STAGE OF CHANGE
>Thinking about change
>Ambivalent
>Aware should change but don't want to
>Costs (cons) of change are greater & more salient
>Benefits (pros) will increase
>Decisional Balance (roughly equal pros and cons)
>>Engage in dialog about reasons for ambivalence
>>Present "role models", examples of strategies
>>Present current stats about cancer, breast cancer, diet, African Americans
>>>and benefits of change

>Situational temptation remains high
>Confidence in ability to change remains low
>>Engage in dialog about experiences
>>Present new and fresh info and ideas about issue
>>Indicate supports available
>>Present "role models"
>>Present strategies for controlling situations

CLIENT TASKS IN THIS STAGE OF CHANGE
>Turn thought into behavior
>Make decision to change
>>Engage in dialog about experiences with change
>>Present strategies for "getting off the fence"

GUIDELINES TO FACILITATE CHANGE
>Actively engage Cs in generating pros and cons
>Acknowledge difficulties inherent in change
>Provide info on the benefits of change
>Get to make commitment to first step
>Establish time-line
>Create or identify support mechanisms/systems

TTM PROCESSES FOR Cs:
Consciousness Raising:
> provide info:
>> Spread the Word about Cancer: Guide...

Self-Reevaluation:
> encourage reappraisal, reassessment

Cs cont'd

Self-Liberation:
> encourage making change by "can-do" belief
> utilize client's will power, commitment, choices
> show alternative choices available via change
>> create or identify support mechanisms/systems
> encourage making commitment
>> establish time-line

Social Liberation:
> help to notice supports to change (menu choices)
>> create or identify support mechanisms/systems

Helping Relationships:
> encourage to seek out and accept help when offered
>> create or identify support mechanisms/systems

VII.   Dietary Intervention for Preparers (Ps)
TTM Stages for Ps:
Consciousness Raising (CR)
Self-Reevaluation (SR)
Self-Liberation (SeL)
Social Liberation (SoL)
Helping Relationships (HR)
Counter-Conditioning (CC)
Stimulus Control (SC)

Processes with Ps:
ADDRESSING THE STAGE CHARACTERISTICS
ADDRESSING WHAT WE KNOW ABOUT THE STAGE OF CHANGE
>   Ready, and intend to change
>   Have a vague plan for change
>   Committed to change
>   Will attempt to change and may fail
>   Engage in lots of experimentation
>   Benefits of change outweigh costs
>   Will engage in change behavior
>   >   Clarify "hang-ups"
>   High temptation to continue behavior
>   Low confidence in ability to change
>   >   Provide examples, "role models"

CLIENT TASKS IN THIS STAGE OF CHANGE
>   Try out different change strategies
>   Recognize what works and what doesn't
>   Learn from personal mistakes

GUIDELINES TO FACILITATE CHANGE
>   Assist with ideas, specific recs, choices
>   Provide change models
>   Provide detailed plan with doable, small steps
>   Provide schedule for feedback

TTM PROCESSES FOR Ps:
>   Consciousness Raising:
>   >   provide info

>   Self-Reevaluation:
>   >   encourage reappraisal, reassessment
>   >   help to recognize own personal triggers

Self-Liberation:
> encourage making change by having a "can-do" style
> encourage making commitment; provide coping skills
> utilize client's will power, commitment, choices
> show alternative choices available in change
> increase client's confidence to resist temptation

Social Liberation:
> help to notice supports to change (menu choices)

Ps cont'd

Helping Relationships:
> encourage to seek out and accept help when offered

Counter-Conditioning:
> help identify possible substitutions for old habit

Stimulus Control:
> help reduce or avoid old cues

VIII.   Dietary Intervention for Actors (As)
TTM Processes for As:
Consciousness Raising (CR)
Self-Liberation (SeL)
Environmental Reevaluation (ER)
Helping Relationships (HR)
Counter-Conditioning (CC)
Stimulus Control (SC)
Reinforcement Management (RM)
Interpersonal Systems Control (ISC)

Processes with As:
ADDRESSING THE STAGE CHARACTERISTICS
ADDRESSING WHAT WE KNOW ABOUT THE STAGE OF CHANGE
      Have a plan for change
      Implemented plan to change
      Relapse and fluctuate although plan generally works

      Benefits of change decrease but remain high
      Costs of change decrease
      Low temptation to continue old behavior
      High confidence in ability to change
      Difficulty managing change
            especially in positive social situations
            in difficult situations

CLIENT TASKS IN THIS STAGE OF CHANGE
      Hang in with change strategies for benefits
      Manage relapses

GUIDELINES TO FACILITATE CHANGE
      Provide change strategy recs
      Support through change
      Help prevent relapse
      Help recover from relapse
      Recycle quickly through earlier stages

TTM PROCESSES FOR As:
      Consciousness Raising:
            provide info

      Self-Liberation:
            provide coping skills vs positive social
            provide coping skills vs difficult situations

utilize client's will power, commitment, choices
increase client's confidence to resist temptation

Environmental Reevaluation:
emphasize impact on others (influence on kids)

Helping Relationships:
encourage to seek out and accept help when offered

As cont'd

Counter-Conditioning:
help identify possible substitutions for old habit
provide alternative menus

Stimulus Control:
help reduce or avoid old cues
suggest alternative places, activities

Reinforcement Management: reward system
recommend low-fat rewards
recommend rewards unrelated to food

Interpersonal Systems Control:
support-seeking
facilitate networks
temptation avoidance
recommend personal strategies

IX.   Dietary Intervention for Maintainers (Ms)
TTM Stages for Ms:
Consciousness Raising (CR)
Self-Liberation (SeL)
Environmental Reevaluation (ER)
Helping Relationships (HR)
Counter-Conditioning (CC)
Stimulus Control (SC)

Processes with Ms:
ADDRESSING THE STAGE CHARACTERISTICS
ADDRESSING WHAT WE KNOW ABOUT THE STAGE OF CHANGE
>   Continue change processes
>   Relapse less likely
>   Clients remain vigilant vs relapse
>   Benefits of change decrease but remain high
>   Costs of change decrease
>   Low temptation to continue old behavior
>   High confidence in ability to change

CLIENT TASKS IN THIS STAGE OF CHANGE
>   Sustain change as life-long habit
>   Resist pull of stress into old habits

GUIDELINES TO FACILITATE CHANGE
>   Help prevent relapse when risk is perceived
>   Help recover from relapse and recycle quickly
>   Learn relapse triggers: events, timing, demogs
>   Learn best strategies for life-long change

TTM PROCESSES FOR Ms:
>   Consciousness Raising:
>>   provide info

>   Self-Liberation:
>>   provide coping skills
>>   vs stressful situations
>>   utilize client's will power, commitment, choices
>>   increase client's confidence to resist temptation

>   Environmental Reevaluation:
>>   emphasize impact on others (influence on kids)

>   Helping Relationships:
>>   encourage to seek out and accept help when offered

Counter-Conditioning:
      help identify possible substitutions for old habit

Stimulus Control:
      help reduce or avoid old cues
      provide broader diet choices for "healthy eating"
      help increase fiber, fruits, vegs in daily diet

Appendix D
Experimental Interventions

Experimental Group Intervention

Outlines for First Intervention Session
for
PC, C, P, A, and M Stages
May 19-22, 1998

PRECONTEMPLATION STAGE

Welcome: 1.   Gave Breast Cancer Pin
            2.   Distributed Dietary Folders: folders included;
            (a) Personal letter
            (b) Lab results
            (c) Forms: Pros & Cons
                        Commitment Agreement
                        Eat Less Fat and More Fiber Checklist
                        Eat More Fruits & Vegetables
                        McDonald's Nutrition Guide
            (d) Do The Right Thing Get a Mammogram book-mark
            (e) Change Your Diet/Change Your Life full size and purse size
                reminders
            (f) Timeline

Introduction/Overview: Process of change where you are-where to go and what to
know (principles of success). You must increase your pro's
for changing to move to the next stage. (Personalize the
problem/Think about it personalize in via impact on
individual, family, and etc. .

Discussion: Personal experiences (there was lots of discussion of this!)

Exercise: List Pro's & Con's
            View Video: TCiB-(Targeting Cancer in Blacks)

Tips:
            1.   Increase Pro's; decrease Cons
            2.   Think about taking the first step: what will it be
            3.   List all changes making/considering all temptations

Wrap Up: Complete commitment form. Promise to think about the problem.

CONTEMPLATION STAGE

Welcome: 1. Give Breast Cancer Pin
  2. Distributed Dietary Folders- folders included:
  (a) Personal letter
  (b) Lab results
  (c) Forms: Pros & Cons
  Commitment Agreement
  Eat Less Fat and More Fiber Checklist
  Down Home Healthy Flyer
  Eat More Fruits & Vegetables
  Choices for Good Health
  McDonald's Nutrition Guide, Eating Smart
  (d) Do The Right Thing Get a Mammogram book mark
  (e) Change Your Diet/Change Your Life full size and purse size reminders
  (f) Timeline

Introduction/Overview: Process of change, ambivalent - why? introduce helpers.

Discussion: Lifestyle analysis and Eating Smart (score); and Personal experiences

Exercise: Pros's & Con's Form
  View TCiB Video-(Targeting Cancer in Blacks)

Tips: 1. Do lifestyle assessment
  2. Review risk assessment analysis
  3. Take small steps - e.g. cut; eat more fruits and vegetables
  4. Establish a time line for change - use commitment sheet

Wrap Up: Complete commitment form. Promise to prepare for the next stage. Identify support mechanisms.

PREPARATION STAGE

Welcome: 1.   Give Breast Cancer Pin
              2.   Distributed Dietary Folders- folders included:

        (a) Personal letter
        (b) Lab results
        (c) Forms: Pros & Cons
                    Commitment Agreement
                    Eat Less Fat and More Fiber Checklist
                    Down Home Healthy Flyer
                    Eat More Fruits & Vegetables
                    Choices for Good Health
                    McDonald's Nutrition Guide, Eating Smart
        (d) Do The Right Thing Get a Mammogram book mark
        (e) Change Your Diet/Change Your Life full size and purse size
            reminders
        (f) Timeline

Introduction/Overview: To progress, shift your vision from the past to the future. Start to imagine the new you that come along with changing.

Discussion: a) Present Lifestyles-personal triggers-how to reduce-a new image
                  b) List supports to change on commitment form, c) Try new strategies

Exercise: Pro's & Con's Form
             View Video TCiB- (Targeting Cancer In Blacks)

Tips: 1. Review Pros & Cons
       2. Review dietary assessment & personal triggers
       3. Sign "Commitment to Change Specific Behaviors Form
       4. List supports to change (e.g. menu choices)
       5. Get and keep support
       6. Create a new image increase self confidence
       7. Get substitutes for wrong habits
       8. Reduce/avoid old cues- [look at specific meal choices]
       9. Experiment - try new strategies - (recipes, meal preparation)
      10. Use a role model

Wrap Up: Promise to think about what low fat eating means? Try to focus on moving to
             the next stage.

MAINTENANCE/ACTION STAGES

Welcome: 1.   Gave Breast Cancer Pin
             2.   Distributed Dietary Folders-folders included:
                 (a) Personal letter
                 (b) Lab results
                 (c) Forms: Pros & Cons
                                 Commitment Agreement
                                 Eat Less Fat and More Fiber Checklist
                                 Down Home Healthy Flyer
                                 Eat More Fruits & Vegetables
                                 Choices for Good Health
                                 Action Guide for Healthy Eating
                 (d) Do The Right Thing Get a Mammogram book-mark
                 (e) Change Your Diet/ChangeYour Life full size and purse size
                     reminders
                 (f) Timeline

Introduction/Overview: being a role model, high confidence, low temptations - but may experience "setbacks", think of this as a "normal lifestyle, cut out temptation in lifestyle, maintain positive self-image, check to see if you're in an earlier stage of change, and plan ahead.

Discussion: a) personal experiences, b) testimony, c) Personal support strategies, d)advice, e) warnings to the research team

Exercise: Temptations Vs Comeback Form
              Pro's Vs Con's Form

Tips: 1. Handle stress.
       2. Get on top of temptations and stay away from "Satan"; (friends and restaurants).
       3. Increase environmental cues and reminders - substitute new behaviors.
       4. Get a usable reward system - food or non-food.
       5. Plan ahead - meals, activities.
       6. Ask family/friends for support.
       7. Make a commitment - there are lots of possible behaviors that you can come to enjoy; prioritize commitments.
       8. Realize that you have reached a stage where you can be a role-model for others.
       9. Keep up knowledge base-know impact on family/friends who are not as aware.
      10. Learn to handle relapse - use as an opportunity for learning.
      11. Watch who you talk with- send people with questions to us.
      12. Use reminder card

13. Be honest as to where you are on the stage of change continuum you may need to recycle and use support form earlier stages e.g. recall many pros to one con.

Wrap Up: Complete commitment form: What does low fat eating mean? What can you do in the next week to handle stress, and temptations. You will be hearing from us soon!

INTERVENTION MATERIALS
June 26, 1998

Intervention Materials
June 26, 1998

1. Letter
2. "Update" Flyer
3. Brochures **(see Experimental Envelope)**
   a) Get a New Attitude About Cancer
      A Guide for Black Americans
      NIH Publication No 93-3412, December, 1992
   b) Targeting Cancer in Blacks
      Meharry Medical College
      Morehouse School of Medicine 1994
   c) Snack Your Way to 5-a-day
      CIS/NCI Publication

DREW-MEHARRY-MOREHOUSE
CONSORTIUM CANCER CENTER

Meharry Medical College

June 26, 1998

Dear

Just a note to thank you for participating in our Dietary Intervention Study.

The luncheon at which most of us met and had our first exchange was a lot of fun!

I am hopeful that you are using the materials in your Special Packet. Enclosed is a very simple attractive brochure on how to incorporate fruits and vegetables into your present diet. Have you ordered the Recipe Book on "Down Home Healthy Recipes" yet?

Please call us to let us know how you are doing. Harlyn and I want to hear from you. The number is 327-6315 or 327-5846.

Sincerely yours,

Margaret K. Hargreaves

Margaret K. Hargreaves
Interim Director and
Associate Professor
Department of Internal Medicine

MKH:hjh

Enclosures (P):   ***Get A New Attitude About Cancer***
                    Targeting Cancer In Blacks
                    Snack Your Way To 5 A Day

Telephone Calls
July 6 - 10, 1998
Questions Asked -
Sample response from each stage of change

Name <u>Grace Brady</u>   **Date <u>7/6/98</u>**

Stage <u>1</u>   **No. of calls made for contact <u>1</u>**   **Time called <u>11:30 am</u>**

Questions?

Have you received your Dietary Packet ? Yes

Have you mailed your "Down Home Healthy" Recipe Card? No, I did not I forgot

Have you made any changes in your eating habits? Some, I've increase my intake of fruits & vegetables, and I've cut down on sweets, but I have been skipping meals

Have you noticed any weight or cholesterol changes? Weight is about the same

Did you enjoy your Dietary Packet? Yes

Do you have any questions or concerns about the project? Not at the moment

Do you have any comments or requests? I appreciate you helping me stay conscious about things that I need to do

When could you come to our "Food Fair" tasting seminar? (Wed. or Thurs. of next week is fine with me)

Would you like to find out what your cholesterol and body fat is ? Yes

Do you have favorite low fat recipes that you would like to share with the group? (send us a copy) I will try to find a couple

Name <u>Jacqueline Harding</u>   **Date** <u>7/6/98</u>   **Stage** <u>2</u>

No. of calls made for contact <u>1</u>   **Time called** <u>9:53 p.m.</u>

Questions?

Have you received your Dietary Packet? Yes

Have you mailed your "Down Home Healthy" Recipe Card? No, I am
going too

Have you made any changes in your eating habits? Yes, I'm eating less fat

Have you noticed any weight or cholesterol changes? Yes, I lost 2 lbs

Did you enjoy your Dietary Packet? **Oh, yes**

Do you have any questions or concerns about the project? No, the project is
running well

Do you have any comments or requests? Another $40.00   *check*

When could you come to our "Food Fair" tasting seminar? (Next Wed. or
Thurs. is fine with me)

Would you like to find out what your cholesterol and body fat is? No

*Do you have favorite low fat recipes that you would like to share with the
group? (send us a copy)* No

Name <u>Abonda Smith</u>   **Date** <u>7/6/98</u>   **Stage** <u>3</u>

No. of calls made for contact <u>1</u>   **Times called** <u>12:22 p.m. & 10:15 am</u>

Have you received your Dietary Packet? Yes, I liked the colorful pamphlets

Have you mailed your "Down Home Healthy" Recipe Card? No, I will do it today

Have you made any changes in your eating habits? Yes, increased fruits and vegetables

Have you noticed any weight or cholesterol changes? No

Did you enjoy your Dietary Packet? Yes

Do you have any questions or concerns about the project? No

Do you have any comments or requests? No

When could you come to our "Food Fair" tasting seminar? (Next Thurs. is fine with me)

Would you like to find out what your cholesterol and body fat is? Well, maybe

Do you have favorite low fat recipes that you would like to share with the group? (send us a copy) I have a folder that has a lot of low fat recipes in it I will try to find it

Name <u>Karen Phillips</u>   **Date <u>7/6/98</u>**   **Stage <u>4</u>**

No. of calls made for contact <u>1</u>   **Time called <u>11:05 am</u>**

Questions?

Have you received your Dietary Packet? Have not received it yet

Have you mailed your "Down Home Healthy" Recipe Card? No, will send it off

Have you made any changes in your eating habits? No, some days I might eat some sweets but I usually balance it out.

Have you noticed any weight or cholesterol changes? Yes, My cholesterol has gone down 10% and I've lost about 4 lbs

Did you enjoy your Dietary Packet? Enjoyed the packet

Do you have any questions or concerns about the project? No

Do you have any comments or requests? I think that it is good that you keep check of the participants and give them encouragement.

When could you come to our "Food Fair" tasting seminar? Love too

Would you like to find out what your cholesterol and body fat is? Not yet

Do you have favorite low fat recipes that you would like to share with the group? (send us a copy) No, I can think of one off hand

Name <u>Tandra Moore</u>   **Date <u>7/6/98</u>**   **Stage <u>5</u>**

No. of calls made for contact <u>1</u>   **Time called <u>9:20 p.m.</u>**

Questions?

Have you received your Dietary Packet? Yes, I thought the packet was very informative

Have you mailed your "Down Home Healthy" Recipe Card? No, not yet

Have you made any changes in your eating habits? Some, I've been trying to cut down on sweets and breads

Have you noticed any weight or cholesterol changes? A little bit, I think I've lọt of inches

Did you enjoy your Dietary Packet? Yes

Do you have any questions or concerns about the project? No

Do you have any comments or requests? No

When could you come to our "Food Fair" tasting seminar? (Next Wed. or Thurs. is fine with me)

Would you like to find out what your cholesterol and body fat is? Yes, maybe

Do you have favorite low fat recipes that you would like to share with the group? (send us a copy) Yes, I have to look them up, and I will bring some low fat muffins or bread

Letters - July 27, 1998
August 25, 1998

July 27, 1998

Participant:

Just a note to thank you for participating in our "FOOD FARE".

Our second meeting was a success and a lot of fun. I hope you enjoyed the food
preparation tips, taste testing of low fat foods, and the "Food Fare" cookbook. Also, we
have enclosed two more recipes that you can add to your cookbook.

We are about to bring closure to this project and the last phase is another fasting blood
sample. I will be contacting you within a few days to schedule you for your appointment.

To meet the Department of Defense requirements, It is critical that we see you between
August 6th - August 14th.

Please call us if you have any questions or concerns. Harlyn and I want to hear from you.
The number is 327-6315 or 327-5846.

Sincerely yours,

Margaret K. Hargreaves
Interim Director and
Associate Professor
Department of Internal Medicine

MKH:hjh

Enclosures: Meat Loaf Roll
**   Stuffed Cabbage Roll**

DREW-MEHARRY-MOREHOUSE
CONSORTIUM CANCER CENTER

Meharry Medical College

August 25, 1998

Just a note to thank you for participating in the Dietary Intervention Study. As promised, we are sending you your final results that were tabulated from your questionnaire describing your fiber and fat intake. The lab test results are also enclosed.

I hope that this program enhanced your knowledge about breast cancer risk and low fat eating.

Please call us if you have any questions or concerns; the number is 327-6315 or 327-5846. And once again, thank you for supporting the Dietary Intervention Study at Meharry Medical College.

Sincerely yours,

Margaret K. Hargreaves
Interim Director and
Associate Professor
Department of Internal Medicine

MKH:hjh

Control Group Intervention

First Mailing, June 5, 1998

1. Letter
2. Brochures **(see Control Envelope)**:
    a) Do The right Thing - Get A Mammogram, NCI
    b) Targeting Cancer in Blacks - Meharry Medical College
    c) Cancer Facts for Men and Women, ACS
    d) Choices for Good Health: Guidelines for diet, Nutrition and Cancer Prevention, ACS

Second mailing, June 26, 1998

1. Poster: Targeting Cancer in Blacks, Meharry Medical College
2. Brochures (**See Control Envelope**):
   a) Being There, African American Breast Cancer Alliance & ACS
   b) Guidelines for the Early Detection of Breast Cancer, ACS
   c) Cancer Facts for Women, ACS

Letters - July 27, 1998
August 25, 1998

July 27, 1998

Participant:

Just a note to thank you for participating in our Dietary Intervention Study.

We hope you received safely the materials we mailed out to you, and had a chance to read them.

We are about to bring closure to this project and the last phase is another fasting blood sample. I will be contacting you within a few days to schedule you for your appointment.

To meet the Department of Defense requirements, It is critical that we see you between August 6th - August 14th.

As promised you will receive $10.00 for your participation.

Please call us if you have any questions or concerns. Harlyn and I want to hear from you. The number is 327-6315 or 327-5846.

Sincerely yours,

Margaret K. Hargreaves
Interim Director and
Associate Professor
Department of Internal Medicine

MKH:hjh

DREW-MEHARRY-MOREHOUSE
CONSORTIUM CANCER CENTER

Meharry Medical College

August 25, 1998

Just a note to thank you for participating in the Dietary Intervention Study. As promised, we are sending you your final results that were tabulated from your questionnaire describing your fiber and fat intake. The lab test results are also enclosed.

I hope that this program enhanced your knowledge about breast cancer risk and low fat eating.

Please call us if you have any questions or concerns; the number is 327-6315 or 327-5846. And once again, thank you for supporting the Dietary Intervention Study at Meharry Medical College.

Sincerely yours,

Margaret K. Hargreaves
Interim Director and
Associate Professor
Department of Internal Medicine

MKH:hjh

1005 Dr. D.B. Todd Boulevard • Nashville, Tennessee 37208 • Telephone: 615/327-6315 • Fax: 615/327-6296

APPENDIX E
Publications, Research Reports
and Personnel

PUBLICATIONS, RESEARCH REPORTS, AND PERSONNEL

PUBLICATIONS
Peer Reviewed

1. Hargreaves, M.K.; Schlundt, D.G., Buchowski, M., Hardy, R.E., Rossi, S and Rossi, J.S. 1998 Stages of change and the intake of dietary fat in African American women: Improving stage assignment using a new eating styles questionnaire. Accepted, J. Amer. Diet. Assoc.

2. Hargreaves, M.K., Buchowski, M., Hardy, R.E., Rossi, S.R., and Rossi, J.S. 1997. Dietary factors and cancers of breast, endometrium and ovary: strategies for modifying fat intake in African American women. Amer. J. Obstet Gynec. 176: S255-264.

RESEARCH REPORTS

1. Schlundt, D.G., Hargreaves, M.K., Buchowski, M. and Bigelow, J. 1998 Development and Evaluation of an Eating Behavior Patterns Questionnaire for the Assessment of Dietary Fat Intake in African-American Women. 12th Invitational Conference on Behavioral Research in Diabetes Mellitus, Tucson, Arizona.

2. Rossi, S.R., Rossi, J.M. and Hargreaves, M.K. 1998 A processes of change measure for decreasing dietary fat intake in African-American women. Annals of Behavioral Medicine 20:S217 (Abstr).

3. Hargreaves M.K., Schlundt D., Buchowski M., Rossi S., and Rossi J. 1997. Stages of Change and the Intake of Dietary Fat in African American Women. Proceedings of the DOD Breast Cancer Research Program Meeting "Era of Hope", Vol 1:193 (Abstr).

4. Rossi S.R., Rossi J.S. and Hargreaves, M.K. 1997. A decisional balance model for Dietary Fat Reduction in African American Women. Annals of Behavioral Medicine 19:S107 (Abstr).

5. Schlundt D., Hargreaves, M.K., Buchowski M., and Bigelow J. 1997. An Eating Behavior Patterns Questionnaire for the Assessment of Dietary Fat in African American Women. Annals of Behavioral Medicine 19:S (Abstr).

6. Hargreaves, M.K. 1996. Reaching Black Women for a Dietary Intervention to Reduce Breast Cancer Risk. Annual Report, Year 2. Submitted to the Department of Defense.

7.   Hargreaves, M.K. 1995. <u>Reaching Black Women for a Dietary Intervention to Reduce Breast Cancer Risk.</u> <u>Annual Report, Year 1.</u> Submitted to the Department of Defense.

8.   Hargreaves, M.K. 1996   Initiating dietary change in black women. Seventh Annual Drew-Meharry-Morehouse Consortium Cancer Center Sympposium, Atlanta, GA.

9.   Hargreaves, M.K. Reaching black women to reduce breast cancer risk. Sixth Annual Drew-Meharry-Morehouse Consortium Cancer Center Symposium, Nashville, Tn, March, 1995.

PERSONNEL RECEIVING SUPPORT FROM THIS EFFORT

1.   Margaret K. Hargreaves
2.   Nasar Ahmed
3.   Jan Bigelow
4.   Maciej Buchowski
5.   Jane Fort
6.   Harlyn Jones
7.   Karen Moore
8.   Joseph Rossi
9.   Susan Rossi
10. David Schlundt
11. Tonya Smith
12. Deborah Sparks